

THIRD BIENNIAL REPORT  
OF  
*The* Department of Conservation  
and Development  
OF THE  
STATE OF NORTH CAROLINA



BIENNIUM ENDING JUNE 30, 1930



COMMERCIAL

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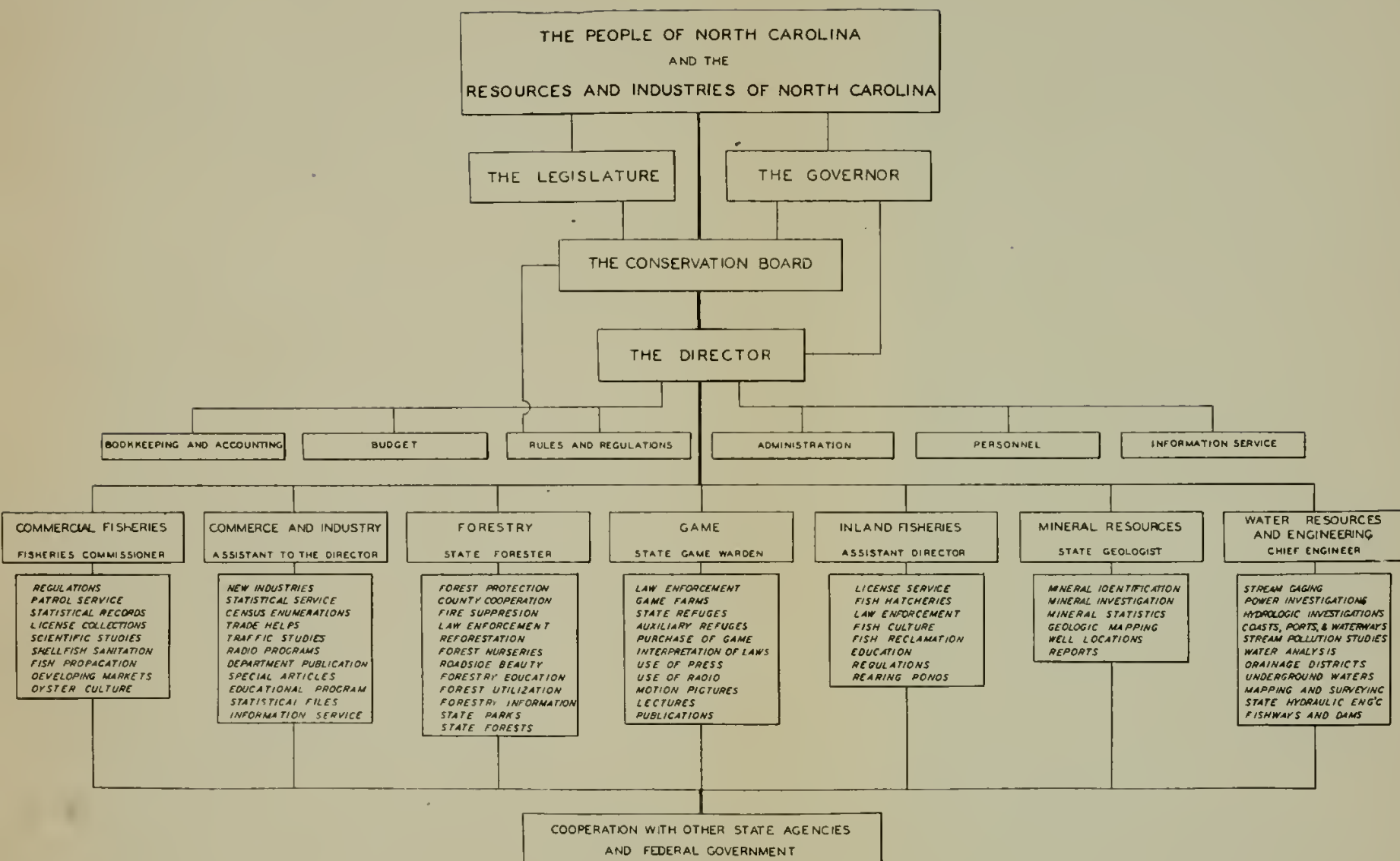
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THIRD BIENNIAL REPORT

OF

*The* Department of Conservation  
and Development

OF THE

STATE OF NORTH CAROLINA

FOR THE BIENNIUM ENDING JUNE 30, 1930

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BOARD OF CONSERVATION AND DEVELOPMENT

Governor O. Max Gardner, Chairman.....Raleigh  
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E. D. Cranford.....Asheboro  
Jos. J. Stone.....Greensboro

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J. W. Harrelson, Director.....Raleigh

## LETTER OF TRANSMITTAL

Raleigh, N. C.,  
October 1, 1930.

To His Excellency, HON. O. MAX GARDNER,  
*Governor of North Carolina.*

Sir:

Pursuant to Section 11, Chapter 122, Public Laws of 1925, and by direction of the Board of Conservation and Development, I have the honor to submit herewith the Third Report of the Department of Conservation and Development for the biennium ending June 30, 1930.

This report shows: (1), the progress, nature and cost of the work done by the Department during the period July 1, 1928,—June 30, 1930; and (2), "North Carolina Home-Coming Week" authorized by Resolution No. 17, Public Laws of North Carolina, Session 1929.

Respectfully submitted,

J. W. HARRELSON,  
*Director.*

# DEPARTMENT PERSONNEL AND PRINCIPAL OFFICERS

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## ADMINISTRATIVE DIVISION

WADE H. PHILLIPS, *Director* (Resigned April 1, 1929)  
J. W. HARRELSON, *Director* (Appointed April 2, 1929)  
R. N. SANFORD, *Principal Accounting Clerk*  
MRS. ETOYAL P. HOBBIE, *Fiscal Clerk*  
GLADYS PRITCHETT, *Purchasing Agent*  
MRS. CARITA WADE MOORE, *Stenographer* (Resigned April 20, 1930)  
FRANCES POPE, *Stenographer* (Appointed April 21, 1930)

## DIVISION OF COMMERCIAL FISHERIES

CAPT. JOHN A. NELSON, *Commissioner*  
N. R. WEBB, *Fiscal Clerk*  
VIRGINIA BROWN, *Stenographer*  
G. L. ARTHUR, JR., *Bacteriologist*

Assistant Commissioners:

J. H. STONE, *Wilmington*                      E. O. SPENCER, *Swan Quarter*  
L. A. QUIDLEY, *Manteo*

## DIVISION OF COMMERCE AND INDUSTRY

PARK MATHEWSON, *Statistician and Assistant Director*\*  
BRYAN W. SIPE, *Statistician*†  
MRS. ELSIE P. DUNN, *Stenographer*

## DIVISION OF FORESTRY

J. S. HOLMES, *State Forester*  
CHAS. H. FLORY, *Assistant Forester*  
F. H. CLARIDGE, *Assistant Forester*  
GRACE WHITE, *Accounting-Clerk-Stenographer*  
ELSIE HOBBY, *Stenographer*  
ANNIE RAMSEY, *Stenographer*  
MABEL DUKE, *Stenographer*  
MRS. MARY P. PHILLIPS, *Stenographer*

District Foresters:

W. K. BEICHLER, <i>Asheville</i>	A. D. FOLWEILER, <i>New Bern</i>
WM. A. NOTHSTEIN, <i>Lenoir</i>	L. A. CARTER, <i>Windsor</i>
W. A. PETERSON, <i>Fayetteville</i>	W. C. HAMMERLE, <i>Wilmington</i>

\*Deceased

†Appointed July 1, 1930



## DIVISION OF GAME

CHAS. H. ENGLAND, *State Game Warden*

MRS. ALICE W. BRADLEY, *Stenographer*

C. L. BEDDINGFIELD, *Chief Clerk*

MRS. LILLIAN BRICKHOUSE, *Clerk*

### District Wardens:

C. N. MEASE, *Black Mountain*

W. C. LISK, *Richfield*

G. A. NICOLL, *New Bern*

## DIVISION OF INLAND FISHERIES

J. S. HARGETT, *Assistant Director*

MRS. MARY F. HARWARD, *Stenographer* (Resigned March 15, 1930)

CHRISTINE POLLOCK, *Stenographer* (Appointed June 9, 1930)

### Hatchery Superintendents:

Morrison Hatchery, FRANK J. REIGER, *Waynesville*

Stedman Hatchery, W. E. BAKER, *Fayetteville*

"Pete" Murphy Hatchery, FRANK S. DYSART, *Marion*

Boone Hatchery, C. E. SMATHERS, *Boone*

Roaring Gap Hatchery, GUY C. WALLACE, *Roaring Gap*

## DIVISION OF MINERAL RESOURCES

H. J. BRYSON, *State Geologist*

GLADYS PRITCHETT, *Stenographer*

## DIVISION OF PUBLIC RELATIONS\*

PAUL KELLY, *Manager*

## DIVISION OF WATER RESOURCES AND ENGINEERING

THORNDIKE SAVILLE, *Chief Engineer*

CHAS. E. RAY, JR., *Principal Assistant Engineer*

H. A. SCHMITT, *Assistant Engineer*

J. T. BROWN, *Assistant Engineer*

L. J. HALL, *Assistant Engineer*

H. A. NELSON, *Coöperative Student*

J. W. WADSWORTH, *Coöperative Student*

ESTELLE FULLER, *Senior Stenographer*

LAURETTA MCGEE, *Junior Stenographer*

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\*This Division merged with Division of Commerce and Industry and its manager made Chief of the reorganized Division shortly before close of biennium.



## ADMINISTRATIVE DIVISION

WADE H. PHILLIPS, *Director* (Resigned April 1, 1929)

J. W. HARRELSON, *Director* (Appointed April 2, 1929)

### STAFF:

R. N. SANFORD, *Principal Accounting Clerk*

MRS. ETOYAL P. HOBBIE, *Fiscal Clerk*

GLADYS PRITCHETT, *Purchasing Agent*

MRS. CARITA WADE MOORE, *Stenographer* (Resigned April 20, 1930)

FRANCES POPE, *Stenographer*, (Appointed April 21, 1930)

*Administration*—The administrative duties of the Department deal with all problems of policies, proposed legislation, and personnel. Causes and effects of laws, rules, and regulations governing the conservation and development of the natural resources of North Carolina are studied. Also laws, rules, and regulations of other States dealing with natural resources of these states are reviewed for the purpose of collecting ideas which can be developed in this State to an advantage.

In administering the laws, rules, and regulations, dealing with the State's forest, game, and fish resources we are attempting to combine the warden service. The use of the same warden force for all these functions is somewhat new. We have during the past biennium made every effort to place the warden service in forestry, game, and fish in the several counties under one county warden. Of the 47 counties coöperating in the forestry, there are only 8 having separate forest wardens, and in all counties game and fish warden services are combined. It is our plan to combine the forest warden service with the game and fish in the remaining 8 counties.

The Department is very much gratified over the success of the combined warden service and believes that it can be maintained at a cost of \$30,000 to \$50,000 per year below the expense of separate administration.

*Bookkeeping and Accounting*—On July 1, 1929, there was set up and coöordinated a new system for keeping the financial records of the Department. The new system has been very successful and enables the Department to keep in detail its records. By establishing a bookkeeping and accounting unit, we are in a position at any time to analyze our financial records. Also we are able to check our accounts and pay our bills with the least possible delay.

*Budget*—Matters dealing with the Budget are handled directly with the Budget Bureau and in accordance with the laws, rules, and regulations of the Budget Bureau.

*Information Service*—The information service is under the supervision of the Division of Commerce and Industry. However, in many cases information is furnished by the separate Divisions. Information service for the press is described in the report of the Division of Public Relations.

*Rules and Regulations*—Rules and regulations are made by the Conservation Board and by the Director. The Director is responsible for the administration of all rules and regulations.

*Personnel*—The Director has final approval of the employment and dismissal of all personnel employed in the Department. The number of permanent employees in the Department varies from 200 to 225.

The heads of the several Divisions in the Department are men especially trained for their respective duties. The first assistants in the several Divisions are also men trained and qualified for their particular duties. The Water Resources and Engineering Division, the Division of Forestry, Division of Mineral Resources, and the Division of Commerce and Industry require scientifically trained men. The Department has been very fortunate in filling these various positions with men especially qualified for the work.

In the field of game, the District Game Wardens are men who have been trained in the field of experience and in a practical side of game conservation.

Our county wardens are selected from among the applicants for the position in their respective counties, more on a basis of integrity and character than on a basis of qualifications. This policy is not satisfactory, but due to the small salaries which are paid to the county wardens we cannot at this time obtain men who have scientific training in the fields of forestry, game, and fish.

The policy so far as county wardens is concerned should tend to the employment of men who have had scientific training in the fields of forestry, game, and fish. The county wardens employed in this Department should be men whose training and rank is equal to that of the county farm agent.

## HOME-COMING

The General Home-Coming Celebration was held throughout the State during the period October 14 to 19, 1929, pursuant to the following authority and instructions of the General Assembly of 1929:

### RESOLUTION 17

"Whereas, the State of North Carolina in recent years has made remarkable progress along many lines and it is fitting that the people of the State should now review the record achieved since the new century began and take note of their further opportunities and possibilities; and,

"Whereas, the North Carolina State Fair, in its new location and under the management of the State of North Carolina as an agency for exhibiting the resources and products of the State was hurriedly opened for an initial exposition last fall, but the management this year will have time for a far more varied and complete exhibit of the agricultural, industrial, and commercial development of North Carolina, with the result that the nineteen hundred and twenty-nine fair will be the first adequate State Fair held on the new location and under State control, and,

"Whereas, various other commonwealths have from time to time held "Home-Coming Weeks" when the scattered sons and daughters of these commonwealths have been invited to return to their native States to join with residents in reviewing the progress made, and further opportunities for development, with a consequent stimulus to State pride and aspiration; now therefore, be it

"Resolved by the Senate of North Carolina, the House of Representatives concurring:

"Section 1. That the week of October fourteenth to nineteenth, nineteen hundred and twenty-nine, which will be the week of the nineteen hundred and twenty-nine North Carolina State Fair, is hereby officially designated as 'North Carolina Home-Coming Week' and during this week all native sons and daughters of North Carolina who now reside in other commonwealths are hereby invited to return to their former home towns and cities and neighborhoods and join with their former neighbors and friends in the celebration of 'North Carolina Home-Coming Week' and to visit the exhibit of North Carolina products and resources as shown at the North Carolina State Fair during that week.

"Sec. 2. That one day during the nineteen hundred and twenty-nine State Fair shall be officially known as 'Dedication Day' when the buildings and grounds shall be formally dedicated to the service of the State with ceremonies directed by the Governor of this State and that the President of the United States is hereby formally invited to be present on that occasion and bring the greetings of the National Government to this Commonwealth, and that the Governor of the State of New York is hereby formally invited to attend during at least one day of the fair to bring the greetings of Northern States to our own State and that the special committee hereinafter named is requested to provide for other addresses daily by eminent Americans and eminent guests returning to this State for



'North Carolina Home-Coming Week,' and for broadcasting by radio if practicable all addresses herein referred to.

"Sec. 3. That a committee to complete details and provide further arrangements for 'North Carolina Home-Coming Week' is hereby named consisting of the Governor of North Carolina, the President of the State University, the President of the North Carolina State College of Agriculture and Engineering, the Commissioner of Agriculture, the Director of the State Department of Conservation and Development, three others to be named by the Directors of the North Carolina State Fair, and such other members to be named by the Governor of North Carolina as he may deem advisable.

"Sec. 4. That for the purpose of inviting former residents of North Carolina to come back to the State during 'North Carolina Home-Coming Week' a specially designated invitation shall be prepared and signed in facsimile by the Governor of the State and the Committee just named, with a facsimile of the Seal of the State attached, and that the State Department of Conservation and Development is requested to print such invitations and forward them to suitable persons whose names may be furnished it and that all agencies of the State Government and county and municipal governments together with the press of the State, are asked to coöperate in all practicable and legitimate ways for promoting the objects and purposes of 'North Carolina Home-Coming Week' as herein set forth.

"Sec. 5. That this resolution shall be in full force and effect from and after its ratification.

"Ratified, this the 13th day of March, A. D. 1929."

Under the authority of the resolution quoted above the following Central Committee on Home-Coming was appointed:

Governor O. Max Gardner.

Hon. Josephus Daniels (Secretary of the Navy, 1913-1921) publisher of the News and Observer.

J. W. Harrelson, Director North Carolina Department of Conservation and Development, Raleigh.

Dr. E. C. Brooks, President of North Carolina State College, Raleigh.

Mrs. A. L. Brooks, Greensboro.

Dr. Delia Dixon Carrol, Physician, Raleigh.

Dr. H. W. Chase, President, University of North Carolina, Chapel Hill.

Mrs. R. N. Duffie, New Bern.

Hon. W. A. Graham, Commissioner of Agriculture, Raleigh.

Mrs. John Sprunt Hill, Durham.

Mrs. Thos. O'Berry, Goldsboro.

Hon. Frank Page, Vice-President Wachovia Bank and Trust Co., Raleigh.

Hon. John A. Park, Publisher Raleigh Times, Raleigh.

Judge John J. Parker, Judge, 4th Circuit, Federal Court of Appeals, Charlotte.

Dr. Clarence Poe, Publisher The Progressive Farmer, Raleigh.

Mrs. W. B. Sullivan, Charlotte.

Judge N. A. Townsend, Executive Council of the State Administration, Raleigh.

Hon. Thos. S. White, President, North Carolina State Fair Board, Hertford.

Mrs. John H. Anderson, Chapel Hill.

On July 28th, 1929, Governor Gardner issued the following proclamation on "Home Coming":

"*Whereas*, The State of North Carolina in the first quarter of the twentieth century has made an astounding record of progress which should now be reviewed by our citizens and made known to all interested Americans. Not in a spirit of pride or boasting should this be done but in a spirit of thanksgiving, aspiration, and dedication to the far greater tasks that lie yet ahead of us. We must make 'That which we have done but earnest of the things we yet shall do.' And

"*Whereas*, In this spirit the last General Assembly of North Carolina provided for the State-wide observance of the week of October 14-19 as 'North Carolina Home-Coming Week' with the request that all native sons and daughters of North Carolina now residing outside the State be invited to return that week and participate in a great State home-coming celebration at the State Capital and in local celebrations in every progressive county of the State where such meetings can be arranged for. Now, therefore, I, O. Max Gardner, as Governor of the State, in accordance with this act of the Legislature, do hereby proclaim the week of October 14-19 as 'North Carolina Home-Coming Week' and call upon all officials, citizens and the press of the State to cooperate in promoting this progressive movement.

"Of paramount importance will be the dedication that week of the new State-owned North Carolina State Fair Grounds with the most comprehensive exhibits of our present-day progress and possibilities ever yet presented, with addresses by eminent Americans and returned North Carolinians broadcasted by radio to every corner of the State. During this Home-Coming Week every native North Carolinian now living outside the State is asked to see this exhibit of the State's resources at Raleigh and to visit again his native county and section.

"To this end I call upon every citizen to send in the names of all relatives and friends outside the State who should be invited to this celebration and I earnestly request the press of the State to cooperate by inserting blanks which will be sent for this purpose.

"I also call upon the editors of the local papers in each county, the secretaries of the local chambers of commerce, the county farm and home agents, and the county superintendent of education, associating with themselves such other persons as they may desire, to meet and organize 'County Home-Coming Celebration Committees' to supplement the major activities at the State Capital."

Done at our City of Raleigh in this State of North Carolina, this twenty-seventh day of July, in the year of our Lord one thousand nine hundred and twenty-nine and in the one hundred and fifty-fourth year of American Independence.

TYRE C. TAYLOR,  
*Private Secretary.*

O. MAX GARDNER,  
*Governor of North Carolina.*

The Central Committee on Home-Coming met in the office of the Governor on Tuesday, July 30, 1929, the Hon. Josephus Daniels presiding in the absence of the Governor. The committee authorized preparation and the issuance of formal invitations to be sent to all native North Carolinians now living beyond the boundaries of North Carolina; recommended for formation of Home-Coming Committees in each County; designed suitable blanks to be used in compiling the list of persons to receive Home-Coming invitations; recommended that October 12 and 13 (Saturday and Sunday) be Home-Coming days for the counties of the State and that distinguished sons of the counties or of the State be requested to speak on Saturday and to occupy the pulpits of local churches on Sunday.

The following plans were authorized for use in securing the names and addresses of former North Carolinians:

- (1) Examine all lists of distinguished persons such as the various "Who's Who."
- (2) Run blanks in all newspapers with request that people knowing the names and addresses of former North Carolinians fill the blanks and mail to the Department of Conservation and Development.
- (3) Secure out-of-State mailing lists from all alumni associations of colleges and universities located within the State.
- (4) Request County and State Officials to send list.
- (5) Secure the mailing list of all North Carolina societies of the various cities and States of the Union.
- (6) Request by radio that listeners-in send in names and addresses for the invitation list.
- (7) Request editors of all the newspapers to send in names and addresses.

The county Home-Coming committees were composed of members of the legislature, county commissioners, chairman county school board, clerk of superior court, register of deeds, county sheriff, superintendent of schools, farm agent, home demonstration agent, editors of newspapers and such other persons as the above mentioned officials may wish to select.

The Central Committee selected the following General Invitation Committee: Hon. Josephus Daniels, Hon. Frank Page, Dr. Clarence Poe, and J. W. Harrelson. Special Invitation Committee to distinguished North Carolinians, Hon. Josephus Daniels, Hon. Frank Page, Dr. Clarence Poe, Mrs. O'Berry, and Judge John H. Parker.

Hon. Josephus Daniels was selected permanent Vice-Chairman and J. W. Harrelson permanent Secretary. Adjourned.

The Invitation Committee at a meeting on July 31 adopted the following formal invitation to be sent to all persons whose names were on the mailing list:



THE GOVERNOR OF NORTH CAROLINA  
AND THE  
GENERAL ASSEMBLY OF NORTH CAROLINA  
THROUGH THE  
STATE COMMITTEE ON HOME-COMING WEEK  
CORDIALLY INVITE

TO VISIT HIS NATIVE STATE AND COUNTY  
DURING THE PERIOD OF  
OCTOBER TWELFTH TO NINETEENTH  
NINETEEN HUNDRED AND TWENTY-NINE  
AND TO PARTICIPATE IN  
HIS COUNTY CELEBRATION ON OCTOBER TWELFTH  
AND TO ATTEND THE  
DEDICATION OF THE NEW NORTH CAROLINA STATE FAIR  
DURING THE WEEK OF  
OCTOBER THIRTEENTH TO NINETEENTH

O. MAX GARDNER,  
*Governor.*

SEAL

JOSEPH DANIELS,  
*Vice-Chairman.*

Many of the counties carried out in an admirable manner the wishes of the Central Committee relative to county celebrations. Some counties made feeble efforts and failed. More than one-half of the counties of the State made no effort whatsoever to hold a celebration.

The Department of Conservation and Development secured by the various methods authorized by the Central Committee the mailing list of approximately 13,000 names. To each person whose name appeared on the list was sent about six weeks in advance of the celebration an informal invitation. The informal invitation contained a message from Governor Gardner, a statement of the objectives for the Home-Coming celebration, and facts and figures showing something of the State's prosperity since 1900 and a statement relative to the Library Dedication at the University of North Carolina.

The following program for Raleigh and vicinity was approved by the Central Committee on Home-Coming:

*Sunday:*

8:30 p. m.—Services at the City Auditorium, Raleigh, sponsored by all of the churches of Raleigh; Speaker, Dr. Geo. W. Truette, President of the Southern Baptist Conference, and Pastor of the First Baptist Church, Dallas, Texas.

*Monday:*

Children's Day at State Fair

6:30 p. m.—Banquet in honor of distinguished Home-Comers by Raleigh Chamber of Commerce at Sir Walter Hotel.

*Tuesday:*

12:00—Address at State Fair grandstand by Governor Franklin D. Roosevelt of New York. Governor Roosevelt will have an escort of honor from downtown to State Fair Grounds. Address will be broadcast by State WPTF.

7:30 p. m.—Gathering of Home-Comers and residents on Capitol Square for celebration of Light's Golden Jubilee. Flood lighting on Capitol will be inaugurated. Songs of other days by singers in Colonial costume. Music by student bands from University of North Carolina, State College, Duke, and Wake Forest.

Address on Thomas Edison's genius by Josephus Daniels. Acceptance of lighting system by Governor Gardner and address by Governor Roosevelt. All talks will be brief. Program will be broadcast.

10:00 p. m.—Dance by Spinx Club at Carolina Country Club.

*Wednesday:*

12:00—Dedication of State Fair Buildings and Grounds by Governor O. Max Gardner from stand in main building. Introduction of Governor by Miss Annie Cherry, President North Carolina Educational Association.

12:30 p. m.—Address by Hon. Joseph M. Dixon, Assistant Secretary of the Interior and a former United States Senator and Governor of Montana a native of Alamance County, from stand in main building. A guard of honor will escort speaker from Sir Walter Hotel to Fair Grounds. Address will be broadcast from Radio Station WPTF.

*Thursday:*

## Carolina Day at State Fair

General Get-together of North Carolinians and Visitors at Fair Grounds

2:00 p. m.—State College-Wake Forest football game at State College.

*Friday:*

## Durham-Duke Day at Durham

1:30 p. m.—Guests meet at Washington Duke Hotel.

2:00 p. m.—Inspection of the Liggett and Myers Tobacco Factory plant (formerly W. Duke Sons & Company plant) where Piedmont and Chesterfield cigarettes are manufactured.

3:00 p. m.—Assemble at the East Duke Building on the old campus for inspection of the new Duke University buildings.

4:00 p. m.—Tea and reception on the new Duke University Campus by Duke University until 5:00 p. m.

7:00 p. m.—Dinner in honor of the guests by the Durham County Alumni Association of the University of North Carolina in the main dining room of the Washington Duke Hotel.

Membership courtesies of the Hope Valley Country Club, which includes the golf links, will be extended to visitors.

*Saturday:*

## University of North Carolina Day, at Chapel Hill

11:00 a. m.—Dedication of new \$625,000 Library Building by President H. W. Chase, Librarian R. L. Wilson and Committee of Trustees consisting of John Sprunt Hill, Chairman; Josephus Daniels; Former Governor A. W. McLean; Congressman Chas. A. Jones; and Rev. J. T. Mangum.

Andrew Keogh, President American Library Association, principal dedicatory speaker.

2:00 p. m.—Carolina-Georgia football game at Kenan Stadium.

5:00 p. m.—Reception and open house at Library Building.

7:30 p. m.—Complimentary performance by the Carolina Play Makers.

Saturday will be the initial day of meetings of the Conference of Education in the South, the Southeastern Library Association, and the North Carolina Association at Chapel Hill.

Home-Comers are requested to register at booth at State Fair where attendant will be on hand to give information and to extend courtesies to visitors.

This program was carried out in detail.

During the days on which the fair ground was open the Department of Conservation and Development maintained a registration booth in front of its exhibit in one of the exhibition halls on the fair grounds.

The response on the part of former North Carolinians to requests to pay a visit to the home State was well worth the efforts and cost. The impression on former citizens of this State and people generally through the country was most favorable. "Down Homers", and others, felt that the State Government and the citizens of the "Old North State" had an interest in the welfare of those born here and now living elsewhere. Many of our own people here learned more of their own State and took great pride in telling the returned ones about it; all of which lent something to the strengthening of our State-group feeling.

Recommendations: It is recommended that a similar celebration be held at the end of each five year period.

The programs for future home-coming celebrations should be worked out in such a way that more responsibility can be placed on the counties of the State. The program for the first day or two of the celebration should be a county affair in its entirety. One of the methods by which proper support can be received from the counties would be to have the invitations extended from the Governor of North Carolina, the General Assembly of North Carolina, and from individual persons or central committees in the counties concerned. The formal invitation should be printed as was the case in 1929 by a duly authorized State agency and sent to the counties for distribution to persons who are interest in inviting some former North Carolinian to come to the State for the celebration. The third of the three parties in whose name the invitations are extended should then be written in the blank space in the invitation before it is mailed to the former North Carolinian.

Former Tar Heels are more interested in returning to their State if the invitations are sent directly from some person or group of persons at the old home. It is believed that if the invitations are sent from the residents of the former home counties of North Carolinians now living elsewhere that the response will be more spontaneous.



## ADMINISTRATIVE DIVISION RECEIPTS AND DISBURSEMENTS

(Including Divisions of Commerce and Industry and Public Relations)

BIENNIAL PERIOD ENDING JUNE 30, 1930

### RECEIPTS

		1928-29	1929-30
101	Salary, Head of Department.....	\$ 6,000.00	\$ 6,000.00
102	Salaries and Wages.....	5,275.60	11,429.50
103	Office Supplies.....	524.46	476.48
104	Postage, tel. Exp. and Freight.....	2,603.79	1,433.00
105	Travel Expense.....	1,273.29	1,928.43
106	Printing and Binding.....	15,552.79	3,965.25
107	Repairs.....	24.19	104.49
108	General Expense.....	257.74	1,544.88
109	Equipment.....	327.76	182.13
109-1	Burroughs Bookkeeping Machine.....		1,140.75
Total Expenditures.....		\$ 31,839.62	\$ 28,204.91
Less Receipts.....		620.65	892.89
Appropriation.....		\$ 31,218.97	\$ 27,312.02

## DIVISION OF COMMERCE AND INDUSTRY

PARK MATHEWSON, *Statistician and Assistant Director\**

MRS. ELSIE P. DUNN, *Stenographer*

The death of Park Mathewson, Assistant Director and Statistician in charge of this Division, makes it impossible to render a complete account of the Division's activities during the biennium.

Some of the projects launched by Mr. Mathewson were left uncompleted and others had been proposed but not yet definitely set under way. This report, because of the circumstances, will give only an outline and brief summary of the program and accomplishments of the Division. Where sufficient information cannot be obtained, it will set forth some of the items in outline form.

### *"Resources and Industries"*

Perhaps the largest task of the biennium consisted of assembling, arranging, and publishing "Resources and Industries," which is believed to be the most thorough inventory of resources and industries ever made in North Carolina.

The publication contains almost 300 pages of tabulated statistics and discussions of raw materials and industries of the State. Its compilation is a result of more than a year of studies and field surveys in which all Divisions of the Department took a part and for which coöperation was obtained from a number of other State Departments.

Charts, maps, and diagrams, used freely in the publication, picture graphically the present status and industrial growth of the State. They also designate various features of the development and the position of the commonwealth among other States. All illustrations shown in the volume were prepared especially for this use.

An outstanding feature of the publication is the segregation of statistics by counties, together with a brief discussion of the natural resources and their development for every county. Each county section of the volume is accompanied by an outline map which shows its principal physical features and characteristics.

The following outline gives an idea of the contents of the publication:

Location Map of North Carolina.

Foreward, Director.

Table of Contents.

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\*Mr. Mathewson died June 3 while attending a national meeting of the Sons of the American Revolution at Asbury Park, N. J. He had held the office of Statistician and Assistant Director since the creation of the Division of Commerce and Industry in 1927. His work introduced a new feature of activity to the Department and what is believed to be a new angle to State governmental operation in the Nation.

## PART ONE

Chart, Trend Largest Industries, 1899-1928.

Physical Divisions and Soils of North Carolina.

Raw Materials:

- a. Minerals and Products.
- b. Forest Resources and Industries.

Agriculture.

Industries of the State:

- a. Water Resources and Power.
- b. Cotton, Textiles, Rayon.
- c. Tobacco and Its Products.
- d. Furniture Industry.
- e. Water Products; Fish and Shellfish.
- f. Resorts, Recreation, Game and Fish.
- g. Banks and Banking.

Communications:

- a. North Carolina's Location and Communications.
- b. Highways of the State.
- c. Map; State Railways, Highways, Airways.
- d. Map; Passenger and Freight Motor Lines, Inland Waterway.

Population, Labor, Wages.

Wealth and Taxes.

Opportunities in Industry.

Statistics of all Industries of North Carolina.

## PART TWO

Map of State, by Counties and Regions.

Facts and Figures of the 100 Counties.

Manufactures by Counties, for 1927.

Detailed Data of Each of the 100 Counties.

Board and Officials, Department Conservation and Development.

Acknowledgements.

Because of the size of the volume and the expense of printing, making a severe drain on the Department's limited printing fund and curtailing the issuance of other materials, it was found necessary to set a price on the publication, \$1 being charged for the bound volume and 50c for the paper cover with 10c additional in each case for postage.

This book has met a consistent demand from the State as well as from various agencies throughout the Nation which request detailed information regarding the State, its resources, and their development. Through the coöperation of the Department of Education, "Resources and Industries" has been placed in virtually every public school library in North Carolina, and has been adopted as a text book by classes at several colleges in



the State. Repeat orders for the book from colleges show the large extent to which it has been put to practical service. Colleges and institutions throughout the nation have placed the volume in their libraries and research files. Plans have been made to revise the publication with latest figures available as often as conditions warrant and as funds are obtained for the purpose.

### *Census of Manufactures*

The Department of Conservation and Development was granted special permission by the U. S. Bureau of the Census in 1928 to take the regular biennial census of manufactures, the second State to be accorded this privilege, and consequently the Statistician of the Department was sworn in as a special agent of the Census Bureau to supervise the enumeration. Fred. W. Coil, agent of the Federal Bureau, was assigned to have active charge of the work and to direct a clerical force supplied by the State.

This arrangement proved highly effective and thoroughly satisfactory to the Department, and it is believed that the results were pleasing to the Federal Bureau. As a result, North Carolina was the first State in the Nation to know definitely its industrial status in regard to output of factories and mills, the number of establishments, number of wage earners, amount of wages and other features of its industrial life for the year 1927. These totals were known and used in North Carolina months in advance of their availability in other States and almost a year before they could have been supplied had this State waited the tabulation of figures for the entire Nation.

Taking of the census allowed the Department to tabulate totals by counties in which form they had not heretofore been available. It also provided a copy of every schedule for the files of the Department which have been useful in special surveys, studies, and enumerations. Considering the expense and effort expended, it is believed that North Carolina profited from the arrangement and that it should be continued if funds can be found available for the purpose.

### *Flow of Goods Survey*

Newest of the statistical features and studies of the Division of Commerce and Industry and perhaps an innovation for any State agency was a study during the biennium of the flow of goods into North Carolina for use in manufacturing processes, preliminary figures of which were announced shortly before the close of this report period.

The survey was undertaken for the purpose of showing the degree to which this State furnishes raw or partly processed materials for its own factories and mills and the classes and costs of these goods. This information, it is believed, will call attention to the local demand for additional products and lead the way to the development of new industries that will help to supply the needs pointed out in the survey.

Available figures from the survey show that 532 of approximately 3,000 of the principal manufacturing establishments of the State purchased elsewhere and brought into the State some \$49,000,000 worth of materials and supplies in one year. Taking this as a cross-section of the manufacturing

establishments of North Carolina, it was estimated that the total of goods purchased in other States by North Carolina manufacturers amounts to between \$150,000,000 and \$200,000,000 annually.

A tabulation of the returns from the survey shows total values in classifications ranging from \$10,000 to \$16,000,000. Many of the articles, it is believed, can be produced as cheaply in North Carolina as elsewhere and they suggest possible opportunities for expanding the industries of the State. Further detailed study of the returns from the survey is believed to have possibilities of offering further helpful suggestions to the industrial life of the State.

The Federal government, as part of the decennial census, in 1930 is undertaking a census of distribution which will go more deeply into problems of distribution than the State study contemplated. These surveys pioneer the way for further consideration of distribution which may help to bring about more efficient operation of industry and a saving in cost to the consumer.

### *Miscellaneous Activities*

Other items to which time and consideration have been given by the Division of Commerce and Industry include the following:

1. A fourth edition of "Facts and Figures", a digest of outstanding points about North Carolina, was issued. This leaflet shows the position which the State enjoys in comparison with others, particularly those lines in which the State leads or excels. The leaflet has proved to be one of the most popular of all of the publications issued by the Department, being greatly in demand by schools and as a general advertising medium for those living elsewhere who are interested in the State as a prospective home or location for industry.

2. Assisted in laying the foundation for an organization of States of the Southeast along lines similar to that followed by the New England Council which has proved to be an important factor in the life of that section of the country. Such an organization in the Southeast, it is believed, would recognize the fact that many of the economic problems of the section are not confined strictly to State lines but are sectional in character and their solution will require concerted action on the part of various commonwealths affected.

Governor O. Max Gardner called a preliminary conference at Asheville on April 28 to consider the feasibility of forming such an organization of States of the Southeast. A resolution to proceed with a permanent organization was unanimously adopted and delegates to the meeting reflected considerable enthusiasm for the proposed organization.

3. This Division has coöperated with other agencies of the State in seeking to obtain the elimination of discriminatory freight rates that burden North Carolina shippers. The Division head attended hearings on this subject and has extended coöperation in every practical manner within his province.

4. Launched a program to show opportunity for expanding the aluminum ware industry in North Carolina. Attention was called to the fact



that although this State is one of the largest producers of pig aluminum in the Nation, none of the material is manufactured into finished ware here.

5. Assembled figures on the tax and debt situation in various counties for use in promoting the industrial development of the State.

6. Promoted the report of monthly statistics by North Carolina merchants in order that they might have advantages of this service offered by the Federal Reserve Bank of the Fifth District in which the State is situated. This service gives a regular periodical index of trade conditions, enabling coöperating merchants to compare their sales with those in other cities and States and to plan their buying program in accordance with information gained thereby as well as providing other useful trade information.

Largely through efforts from this Division, merchantile firms from Asheville, Durham, Charlotte, Raleigh, Winston-Salem, Burlington, Salisbury, Lexington, and Gastonia, were induced to begin this service.

7. Continued service as Trade Secretary of the U. S. Bureau of Foreign and Domestic Commerce. This consists largely of a close contact with business and industry for distributing the varied trade information offered by the Federal Bureau. Not only does the Bureau assist American firms actively to expand their foreign markets by keeping them informed of the trends and conditions, but it carries out varied studies and researches for the purpose of accomplishing economies and increasing efficiency in trade. Being a rapidly growing industrial State, it is important that North Carolina's marketing facilities be studied and expanded to meet current demands if progress is to continue.

8. Close contacts were maintained with the various local Chambers of Commerce and industrial bureaus of the State. This Division has served as a clearing house for State-wide information, and has undertaken to the extent of its facilities, the collection and consolidation of local information upon request. The Division has lent special assistance when called upon in helping to land new industries for various localities.

9. Assistance was given by the Division in efforts to obtain a 30-foot channel for Wilmington through the preparation of a brief which involved exhaustive studies. Similar information was assembled to promote the development of a harbor at Beaufort.

10. The Division has acted as a statistical gathering and collating agency to meet special requests for information regarding North Carolina. Statistics on the State have been furnished to magazines for feature articles, to research agencies, and to advertising agencies having contracts in North Carolina. Considerable work is also done to meet individual requests for information and statistics.

## DIVISION OF FORESTRY

J. S. HOLMES, *State Forester*

CHAS. H. FLORY, *Assistant Forester*

F. H. CLARIDGE, *Assistant Forester*

GRACE WHITE, *Accounting Clerk-Stenographer*

ELSIE HOBBY, *Stenographer*

ANNIE RAMSEY, *Stenographer*

MABEL DUKE, *Stenographer*

MRS. MARY P. PHILLIPS, *Stenographer*

The conservation of the forest resources of the State for the economic and social welfare of our present and future citizens is no mean job. It involves the question as to what is the best use of the land and the relation of forest areas to the soils, waters and wild life of the State and deals with the human uses of such areas.

The prevention and suppression of forest fires is still the largest part of the work of the Forestry Division, not only because of its supreme importance, but also because nearly 80 per cent of the total budget of the Division is given specifically for this purpose. It is, however, impossible to consider one feature of the work as separate from the rest. The distribution of planting stock stimulates public interest in forest protection, and recreational and scenic areas must be protected from fire. The educational work carried on by the whole Division, not only gradually brings about a State-wide forest mindedness, but cultivates a broad appreciation of the interdependence of humanity and all other living things.

## FOREST FIRE CONTROL

*Personnel.* There has been little change in personnel during the past eighteen months, most of the changes listed below having taken place in the first half year of this biennium.

W. A. Peterson who was acting as special agent on the timber resource study for the Division, was appointed District Forester in charge of District No. 3, headquarters at Fayetteville, July 20, 1928.

W. L. Nothstein, also acting as special agent on the timber study, was appointed Junior Forester in charge of visual education on September 7, 1928. Nothstein was later promoted to the rank of District Forester in charge of District No. 2, headquarters at Lenoir, on January 28, 1929.

A. D. Folweiler, formerly with the U. S. Forest Service at Asheville, was appointed as District Forester in District No. 2 on August 8, 1928, to fill the vacancy made by the resignation of H. M. Sebring. Folweiler was transferred as District Forester to District No. 4, headquarters at New Bern, on January 28, 1929, to fill a vacancy left by E. M. Eutsler.

E. M. Eutsler, District Forester in District No. 4, since June, 1928, resigned December 7, 1928.

W. C. Hammerle, formerly a senior ranger on the Cherokee National Forest, was appointed District Forester in the newly created District No. 6, with headquarters at Wilmington, on July 1, 1929.

E. P. Simmons, Chief Warden in District No. 4, headquarters New Bern, resigned August 20, 1928, to take up work with the American Forestry Association.

F. L. Hooker, County Warden of Craven County, was promoted in August, 1928, to the rank of Chief Warden in District No. 4.

H. R. Miller, County Warden of Hertford County, was promoted to the rank of Chief Warden in District No. 5, headquarters at Windsor, on a part time basis on August 1, 1928. He was placed on full time duty on July 1, 1929, when a total of eight coöperating counties were had in the District.

C. H. Hearn, Chief Warden in District No. 3, was transferred to take charge of the motion picture truck, on February 1, 1929.

T. R. McMillan, County Warden of Duplin County, was promoted to the grade of Chief Warden in District No. 3, headquarters at Fayetteville, on February 1, 1929.

Mary L. Waters, Clerk in District No. 4 office, resigned May 1, 1929. She was succeeded by Annie K. Cook on the date of May 15, 1929.

Mable C. Duke was transferred from the Division of Commerce and Industry to the Forest Fire Control branch on July 11, 1929, when the new District No. 6 office opened, and a number of new coöperating counties were added.

T. C. Evans, a graduate of the 1930 forestry class at North Carolina State College has been given temporary employment as construction foreman on improvements beginning June 15, 1930.

The immense turnover in personnel during the summer of 1928 was finally adjusted near the end of that year. There seems no doubt that this frequent turnover is largely due to the low rate of salaries paid technical men in this State. Of the ten technical men and one non-technical man who left the service during the past four and a half years, nine of them did so at considerable increases in salary.

*Workman's Compensation.* One of the most important questions in relation to the personnel of the Forestry Division is the rating of each class of employees under the Workman's Compensation Law of 1929. Although State departments are held responsible for compensation under the law just as corporations and firms are, no provision has been made in the budget for paying the awards of the Industrial Commission. This should be provided under a contingent item or an emergency allotment.

The question has come up this past spring as to whether a fire fighter properly summoned is a State employee under the meaning of the act. The Commission and the Attorney General differ on this question and compensation awarded by the former for the loss of an eye while fighting fire has been held up until the case can be reviewed by the Superior Court, and, probably, by the Supreme Court.

*Coöperation. a. Federal.* Under Section 2 of the Clark-McNary Law, the Department received financial assistance from the Federal government



in forest fire control during the fiscal year 1928-29 in the amount of \$41,438, and during the 1929-30 fiscal year, \$44,757, a total increase of \$10,757 over the last biennium. North Carolina receives more Federal money for this purpose than any other Southern State and at the present time receives the tenth largest allotment of the thirty-nine states that qualify. Beginning with the 1930-31 fiscal year, the new classification of allotments becomes effective which will give a further increase provided this can be matched from other funds.

*b. State.* The people of North Carolina have not yet realized the importance, magnitude or permanence of this State job of protecting from fire the twenty-million acre tree crop so that its owners can reasonably expect revenue from every acre. During the 1928-29 fiscal year a State appropriation of only \$29,374 was received. For the 1929-30 fiscal year \$12,031 was allotted from the \$30,000 total State appropriation for forestry; but the appropriation bill also provided for a transfer of \$42,020 of game funds to forest fire control which brought up the State's part of the total fire control fund to \$54,051. This remaining part of the total budget figure of \$136,864 was contributed by the various coöperating agencies.

*c. Special State Appropriation.* (Great Smoky Mountains National Park.) A special State appropriation of \$4,500 for fire protection on the lands of the proposed Great Smoky Mountains National Park was given for the 1929-31 biennium, \$3,000 of which was to be used for the 1929-30 fiscal year and \$1,300 for the 1930-31 fiscal year. Protection of these lands began in the spring of 1929 when \$650 was advanced by the North Carolina Park Commission to be utilized during that spring fire season. Due to the severity of the spring fire season of 1930, this allotment of \$3,000 was slightly overdrawn, but the balance remaining will probably be sufficient to carry the work through the first six months period of the 1930-31 fiscal year, during which time it is expected that the Federal government will assume protection of these lands. Ten patrolmen were on duty during the spring of 1930.

*d. County Coöperation.* County coöperation increased from thirty-one counties in the 1927-28 fiscal year to thirty-eight counties in the 1928-29 fiscal year and forty-four counties in 1929-30. The total allotments from these counties increased from \$21,600 during 1927-28 to \$24,050 in 1928-29 and \$30,625 (budget estimate) in 1929-30.

Allotments from counties are now considerably larger than in past years, yet the majority of the counties still provide an insufficient amount to properly carry on the work in the county. In requesting these allotments from counties, they are now estimated on the basis of forest land to be protected and the hazard presented rather than the county's ability to pay. All contracts are on a "fifty-fifty" basis, the fiscal year corresponding to the State's, and counties cannot withdraw their coöperation during the period of the fiscal year.



The following table shows the coöperating counties together with the amounts provided during the biennium.

Counties	Appropriations F. Y. 1928-29	Appropriations F. Y. 1929-30
Alexander.....	\$ 200*	\$ 350
Avery.....	300	300
Beaufort.....		1,250
Bertie.....	800	800
Brunswick.....	1,000	1,000
Buncombe.....	1,000	1,000
Burke.....	360	400
Caldwell.....	650	750
Columbus.....		2,000
Craven.....	1,900†	1,000
Cumberland.....	750	750
Chowan.....	300	300
Duplin.....	1,200	
Edgecombe.....		500
Greene.....	500	500
Halifax.....	600	600
Harnett.....	500	654
Haywood.....	400	400
Henderson.....	300	350
Hertford.....	500	500
Hoke.....	400	500
Jackson.....	500	500
Lee.....	300	375
Lenoir.....	1,100	600
Macon.....	400	200*
McDowell.....	700	700
Madison.....	500	500
Montgomery.....		750
Moore.....	750	800
New Hanover.....	300	750
Northampton.....	500	500
Pitt.....	750	750
Polk.....	300	300
Richmond.....		750
Robeson.....	1,200	1,200
Rutherford.....	600	600
Scotland.....	500	500
Surry.....	500	500
Swain.....	500	500
Transylvania.....	400	
Warren.....		500
Washington.....		600
Wayne.....	1,000	1,000
Wilkes.....	500	500
Wilson.....	500	650
Yancey.....	300	300

\*Part year.

†Includes \$750 for tower.

*e. Private Coöperation.* At the close of the biennium sixty companies, firms, and individuals formed into thirteen associations were paying an assessment rate of from 1 cent to 2½ cents per acre for special fire protection on their holdings which total 319,163 acres. One association began its work with an assessment rate of 5 cents per acre in order to immediately provide for improvements necessary for intensive protection. At the close of the biennium total private association assessments amounted to \$4,989. Excellent results have been obtained on these areas proving the feasibility of continuing and expanding this form of coöperation. The proposed Dismal Swamp Association in the Northeastern part of the State as well as a proposed 40,000 acre association in Wilkes County had to be continued for further action until additional State funds became available to match the coöperators' funds. With little additional work the areas of private lands under this form of protection could be greatly expanded.

The following statement gives the names of the organizations coöperating with the State Forest Service on June 30, 1930, together with the rate of assessment, the counties in which the lands lie, the names of the land owners and the number of acres listed under the protection agreement by each owner.

## FOREST PROTECTIVE ASSOCIATIONS

Name and Assessment Rate	Counties	Individuals	Acreage
Chemical Wood Corporation, 2c	Avery and Mitchell	Chemical Wood Corporation.....	3,000
Elk Creek Protective Ass'n, 1c	Watauga, Wilkes and Caldwell	Elk Creek Lumber Company.....	40,000
South Mountain Association, 1c	Burke, McDowell and Rutherford	Wright-Bachman Lbr. Co.....	20,000
		C. M. Benedict.....	470
		Hutton-Bourbonnais Lbr. Co.....	13,601
		Town of Morganton.....	3,000
		Virginia Greyson.....	407
		Realty Loan & Guaranty Co.....	2,150
		South Mountain Development Co...	1,100
		North Carolina School for Deaf.....	513
		State Hospital.....	2,000
		F. W. Hossfield.....	1,400
		Mull-McGimpsey.....	500
Table Rock Protective Ass'n, 1c	Burke	D. E. Latham.....	640
		Holston Corporation.....	2,767
		Packer and Harrison.....	25,900
Moore Protective Ass'n, 2c	Moore	Ralph W. Page.....	350
		L. L. Biddle.....	111
		Augustine Healy.....	280
		Pinehurst, Inc.....	3,705
		Pine Needles Inn.....	531
		Midland Farms.....	837
		M. W. Marr.....	500
		M. C. McDonald.....	1,500
		H. C. Buchanan.....	2,000
		Geo. P. Hawes.....	50

FOREST PROTECTIVE ASSOCIATION—*Continued*

Name	Counties	Individuals	Acreage
		Knollwood Inc.....	1,000
		Frank Maples.....	50
		Pinewild Farm.....	1,750
		Moore Co., Inc.....	280
		S. B. Chapin.....	800
		V. Z. Reed.....	378
		James Barker.....	2,000
		Mid Pines Country Club.....	180
		Mrs. E. C. Bliss.....	150
		Judge W. A. Way.....	450
		D. J. Ross.....	425
		Paul Dana.....	250
		Marr Farms.....	500
		W. M. Hutt.....	75
		Samuel G. Allen.....	50
		John Powell.....	126
		Miss Alice Presbrey.....	70
Overhills Protective Ass'n, 1c	Harnett	Never Fail Farm.....	5,000
		Alex Sprunt.....	6,000
		Overhills Land Co.....	30,000
		Van Lindley Nursery.....	1,340
Craven Protective Ass'n, 2c	Craven	Neuse Lumber Co.....	835
		Empire Mfg. Co.....	4,973
		Pine Lumber Co.....	17,600
		Rowland Lumber Co.....	2,000
Serpell Timber Corp., 1½c	Carteret	Serpell Timber Corp.....	6,600
Camp Mfg. Co., 1c	Bertie	Camp Mfg. Co.....	19,952
Camp Mfg. Co., 1c	Hertford, Gates	Camp Mfg. Co.....	25,507
Foreman-Blades Lbr. Co., 1c	Bertie	Foreman-Blades Lbr. Co.....	23,819
Cooper River Timber Co., 2c	Pender	Cooper River Timber Co.....	10,280
Waccamaw Prot. Ass'n, 2½c	Bladen and Columbus	Waccamaw Lumber Co.....	4,000
		Eric Norden.....	5,000
		K. Clyde Council.....	4,404
		Cooper River Timber Co.....	16,007

*f. Coöperation Within the Department.* Coöperation with the Game and Fish Divisions has developed during the biennium. Of the total of thirty-nine counties coöperating in fire control at the end of the 1928-29 fiscal year, twenty-five of the county wardens were combined game, fish and forest wardens, and at the end of the 1929-30 fiscal year, of the forty-four counties coöperating, thirty-five of the county wardens held these combined appointments. This assured full time service from these men resulting in higher efficiency and greater economy. In addition to the combined wardens, one District Forester is temporarily serving as a district

game and fish warden and two chief forest wardens and one county forest warden also serve as district game and fish wardens.

*g. Railroad Coöperation.* All the major railroads in the State as well as some smaller ones are coöperating in fire control work to the extent of burning rights-of-way and giving closer inspection to spark arresters and ashpans and instructing their employees in care with fire. Every railroad billed for suppression costs of fires for which they are held responsible has paid these costs during the past year. There is much to be done, however, in the way of instructing track foremen in the proper methods of right-of-way burning and to have closer and better inspection given to spark arresters and ashpans. Conferences are being planned with all the larger railroads to secure their closer coöperation in proper fire control measures.

*Progress in Protection.* The following chart shows the progress made during the two fiscal years compared with two previous bienniums.

PROGRESS CHART

	June 30, 1925	June 30, 1927	June 30, 1929	June 30, 1930
District Foresters (Number).....	4	5	5	6
Chief Wardens (Number).....		4	5	5
County Forest Wardens (Number).....	20	25	42	45
District Forest Wardens (Number).....	261	550	886	1,115
Deputy Forest Wardens (Number).....	1,530	2,800	3,541	4,071
Minute Men (Number).....			2,053	2,299
Total Forest Wardens and Minute Men....	1,815	3,384	6,532	7,541
Counties Coöperating (Number).....	25	26	38	44
Private Timberland Owners Coöperating (Number).....	5	21	55	60
Forest Land Under State Protection.....	6,729,802	6,995,038	8,675,030	10,067,763
Appropriations by Counties.....	\$ 9,827	14,600	24,050	30,625
Appropriations by Private Owners.....		2,410	3,581	4,989
Appropriations by State:				
From Forestry Appropriation.....	18,682	16,990	29,374	12,031
From Game Fund.....				42,020
Special for Smoky Mountains Park.....			558	2,442
Appropriation by Federal Government.....	19,875	34,000	41,438	44,757
Total Appropriations.....	\$ 48,384	\$ 68,000	\$ 99,001*	\$ 136,864

\*Budget figure plus \$558 for Smoky Mountains Park protection.

*Equipment and Improvements. a. Fire Fighting Equipment.* Non-expendible fire fighting equipment purchased and distributed to the warden organization during the period of this report includes 1,640 fire rakes, 1,414 knapsack pumps, 349 brush hooks, one gross fussees, 8 lanterns, 102 buckets, 195 fire swatters, and 12 trailers. The trailers are equipped with stake bodies for transporting equipment, fair material, etc., as well as tanks for water.



The major portion of the fire fighting equipment is now being purchased with coöperative money and supplemented by purchases from State funds; and an approach is being made to adequately equip field forces. Most purchases are made from unexpended balances remaining at the end of the fiscal year so that no handicap is placed on the fire prevention activities. During the fall period of 1928, a recently patented machine designed for brushing a fire line was tested out in Columbus County to determine its merits for use in this State. The machine did not prove satisfactory. Two recently improved back-fire torches designed by the Houck Manufacturing Company and a similar torch manufactured by the Aerial Torch Company were tested and while all three of these torches were approved, lack of funds prevents their purchase at the present time. They are, however, highly recommended for use in burning fire lines and safety strips and should be a part of all railroad right-of-way burning equipment. The fire swatter listed above has been put on the market by the Council Tool Company, a North Carolina firm. This tool, which has been given wide use in the Gulf States, will be adopted as standard fire fighting equipment with us.

*b. Lookout Towers.* Ten steel lookout towers were erected during this period as follows:

LOOKOUT TOWERS

Name	Height No. Ft.	County	Location
Horse Ridge.....	35	Burke.....	3 miles South Enola
Pembroke.....	80	Robeson.....	1 mile East Pembroke
Croatan.....	100	Craven.....	At Croatan
Waccamaw.....	93	Columbus.....	5 miles North Wananish
Duggar.....	35	Watauga.....	On Duggar Mountain near Penley
Spivey.....	35	Buncombe.....	Near Candler
Pores Knob.....	47	Wilkes.....	South of Moravian Falls
Parkton.....	100	Robeson.....	1 mile West of Parkton
Thomas.....	93	Hertford.....	4 miles West of Ahoskie
Bolivia.....	100	Brunswick.....	4 miles South of Bolivia

All of the above are inside-stairway type towers except Duggar which is an inside-ladder type. All towers erected during the period of this report were purchased from the funds of coöperating units. There are now twenty towers in the detection system consisting of one stone, three wood and sixteen steel towers, all of which are considered as primary stations in the proposed system of one hundred and twenty-five towers. In addition to the above, through coöperation with the Pisgah National Forest, a lookout has been placed on Table Rock where no tower has been necessary. A cabin has been erected at the base of the Rock for the shelter of the observer. A wooden cabin has also been built at the base of the Horse Ridge tower for the same purpose.

Lack of funds to erect sufficient towers necessitates the use of existing structures for lookout purposes and the following stations were manned

during the 1930 spring fire season in addition to the twenty lookout towers: Carolina Hotel, Pinehurst; State Sanatorium, Hoke County; North Carolina Bank and Trust Company's Building, Wilmington; Wayne National Bank Building, Goldsboro, and the First National Bank Building in Wilson. A temporary map stand worked up by D-4 is being used on the buildings that are serving as temporary lookout points.

A budget ruling preventing the transfer of money from "Personal Services" to "Equipment" under the Coöperative item has prevented the purchase of a 100-foot steel lookout tower from the unexpended balances remaining in Columbus County at the close of the 1929-30 fiscal year. This tower will be purchased and erected immediately after July 1, 1930.

A number of companies manufacturing steel lookout towers were interested in supplying our needs so tower bids from five of these companies were asked in January, 1929. One North Carolina bid and four bids from outside of the State were received, the Aermotor Company of Chicago underbidding all other manufacturers. Their three types of steel towers have been adopted as standard.

*c. Telephone Lines.* During the period of this report, a total of 64.26 miles of telephone line was constructed, consisting of 28.1 miles of ground circuit line and 36.16 miles of metallic circuit. There are now in the telephone system under State control 89.73 miles of metallic circuit line and 35.85 miles of ground circuit line, a total of 125.58 miles. All telephone lines are constructed with the intention of tying in lookout towers with the District offices and with the warden organization. Six miles of ground circuit line were constructed by the U. S. Forest Service from Jonas Ridge to Table Rock lookout in Burke County. This line will be maintained by us. Poles have been set for two miles of metallic circuit line to connect the Pembroke tower with the local telephone company in Pembroke, Robeson County. Construction is also going ahead at the present time on nine miles of ground circuit line to connect Table Rock lookout with District Warden Beck in Burke County and plans are completed to build two additional spur lines of sixteen miles from the Elk Creek telephone system in connection with Duggar Mountain tower. Considerable additional telephone line work will be required during the next six months period.

*Prevention Publicity. a. Motion Pictures.* To broaden out prevention activities, a complete portable motion picture outfit was purchased in September, 1928, to tour the State and give motion pictures, illustrated talks and lectures to school children, camps, civic clubs, fairs, expositions or any meeting where sufficient people could be gathered together to be interested in the project. In addition to the truck the outfit included a 1,000 SVE Acme Projector, a Kohler Model 15-watt generator, a slide projector, a 10x12 foot rubber screen and a 4x5 foot daylight screen. Twelve reels of forestry motion pictures showing forests and wild life were included. Camping equipment including a cot, mattress, blanket and cooking utensils form a necessary part of this outfit.

The purchase of the truck and equipment was made in connection with the purchase of five similar units outfitted by the American Forestry Association at Atlanta. The whole of this equipment when completed cost



\$4,665.12 and was purchased at a saving of approximately 30 per cent of the local prices.

A technically trained forester was at first employed to operate the project, but he was later replaced by a local man. After the Game Division made us its five-reel game and fish picture which has been continually used in the project, it shared with the Forestry Division the payment of this man's salary. The outfit was first of all placed on a fair schedule and attended ten fairs principally in the eastern part of the State during September and October of 1928, as well as during the fall months of 1929. On November 10, 1928, the school showings were started in District No. 1, the unit operating six days to the week from that date to the present time except during an influenza epidemic in January, 1929, when the schools in the western part of the State were closed. The educational truck from its beginning to the date of June 15, 1930, covered 58 counties, gave 449 shows with a total attendance of 110,498, of which 49,111 were adults and 61,387 were children. In addition 27 talks and lectures were given on occasions when it was not possible to show the pictures.

Counties coöperating in forest fire control were first given attention, but in the past six months counties have been visited in the order of minimum travel. It is intended that the project shall cover all the larger rural schools of the State and it is expected that the program will extend well into 1932. Much favorable comment has reached the central office on the influence of this project and its cost has been well worth while.

An auxiliary motor picture outfit, consisting of a DeVry projector, Homelite generator, and a complete set of films is also available and has been used for more intensified work and to take care of local showings in smaller schools not covered by the truck project. The outfit has been used in all Districts during the period of this report with highly satisfactory results.

A new forestry picture, "Friends of Man" was made in connection with the motion picture project. It was found that very few forestry pictures available for showing, gave true southern conditions. It was therefore decided to make a picture of three or four reels dealing primarily with forest conditions in the Coastal Plain section of North Carolina and equally applicable to similar conditions in the southeast and Gulf States. The matter was accordingly taken up with the U. S. Forest Service and in the fall of 1928 a scenario for the picture was worked up. The Office of Motion Pictures, U. S. Department of Agriculture, supervised the taking of the film, the work on which began on March 22 and ended on April 14, 1929. One professional actor was hired and another actor was brought from the Arkansas National Forest, the remainder of the characters used being from Wilmington. The thanks of this Department are due Mrs. Hugh MacRae and other members of the Little Theatre Guild of Wilmington for their deep interest and invaluable help in staging the picture which was made largely in New Hanover County. The American Forestry Association coöperated financially to the amount of \$500 and this Department's expenses amounted to \$523. The U. S. Department of Agriculture furnished all technical men, camera equipment and supplies, directed the field work and developed and assembled the picture. The completed four-reel picture became available in January, 1930, and is now being used throughout the

State. A number of Southern States have purchased copies of the picture as well as some of the Northern and Northwestern States. Mr. Flory closely supervised the production of this picture and was untiring in his efforts to bring the parties together and make a success of this all North Carolina movie.

The West Virginia Pulp and Paper Company very courteously presented the Department with a copy of a one-reel picture "When Trees Talk" made by them. This interesting picture is being used at the present time on the educational truck.

*b. Fair and Other Exhibits.* During the biennium, two portable exhibits were used in the eastern and western parts of the State which covered a total of forty-four fairs, consisting of two exhibits at the State fair in 1928-29, the Industrial Exposition in the spring of 1929, one exhibit at the Eastern Carolina Chamber of Commerce Exposition at Farmville, two exhibits at the North Carolina Forestry Association meeting at Goldsboro and Asheville, thirty-four county fairs, and floats placed in two parades in connection with the Feast of the Pirates at Wilmington and the historic pageant at New Bern. It is estimated that between 650,000 and 700,000 people saw these fair exhibits, and no doubt many additional people were reached by the forty-five thousand pieces of printed matter distributed at the exhibit booths.

Owing to the fact that practically all of the material which we now have has been exhibited at the regular schedule of fairs, it is necessary that a complete revision of the material be made before the fall season of 1930. The educational truck followed as many of the fairs as possible and assisted in setting up the exhibits and dismantling them, the operator showing motion pictures and having general charge of those exhibits which he attended. The most outstanding exhibits were placed at the State Fair in 1928 and 1929 where 60 feet of frontage space was had for all the Department's exhibits as well as an outside display of game and fish exhibits.

*c. Posters, Signs, Pamphlets, etc.* There were purchased or obtained during the period of this report and distributed throughout the organized districts: 1,500 fire prevention posters, 40,000 forest fire law pamphlets, 19,000 U. S. Forest Service pamphlets and circulars, 4,000 book marks, 2,000 handbills to advertise motion picture shows, and 10,000 forest fire and game stickers. There were also prepared and erected 2,000 warden steel flange signs, 4,000 signs warning against destruction of posters, 136 county boundary shield signs, 10 tower direction signs, and 16 tower name signs.

*d. Press.* The increasing coöperation of the State press is one of the most encouraging features of the fire prevention work. Articles from the central office and district offices are accepted and widely used. This is one of the most important activities carried on by the office and field force. The district foresters report the finest coöperation from the newspapers circulating in their respective districts.

*e. "The Forest Warden."* Eight quarterly issues of this publication of the Division devoted to forest fire prevention were distributed during the period. The 1929 issues consisted of 4,500 copies and the 1930 issues com-



prised 5,500 copies each. This publication goes to all county commissioners, district and county forest wardens, the forestry exchanges, daily newspapers, lumber companies, etc. There is much to be said in favor of enlarging this publication to eight pages.

*Warden and Other Meetings.* On August 27-29, 1929, a forest fire control conference was held at Beaufort, N. C. Twenty-six people including foresters from surrounding states and from the U. S. Forest Service attended the meeting. The session included talks by visiting foresters as well as a complete presentation of papers by the district foresters and chief wardens dealing with fire control activities in the State.

In the 1928-29 fiscal year, thirty-six warden meetings were held, and in the 1929-30 fiscal year, forty-one warden meetings were held. These are primarily schools of instruction for the wardens in coöperating counties and an attempt is made to hold one meeting in each county annually. Owing to the expense involved in holding these meetings, only the district wardens are required to attend. In addition to these meetings, the county wardens of each district are now being brought together at least once a year to be completely instructed as to their duties and activities.

The following other meetings were attended: East Tennessee District Patrolmen Conference in Knoxville, annual meeting of the American Forestry Association at Jacksonville, Florida, and the Southern Forestry Congress at Memphis, Tennessee. No record is attempted here for such meetings as schools, civic clubs and other organizations covered by the field and central office forces.

*Fire Occurrences and Statistics.* Fire control results during the 1928-29 fiscal year were more gratifying than usual. Weather conditions were favorable during practically the whole of the fire season months. During the spring season scattered fires occurred through January and February, though the worst fire period occurred in March and the first half of April. Two peaks in the occurrence of fires were reached on March 7 and 28 and four less important peaks occurred on April 2, 3, 6, and 9. The dangerous spring season closed quite abruptly on April 13. The western districts experienced but one bad peak in the occurrence of fires on April 9, the season ending abruptly on April 21.

The 1929 fall fire season was even more favorable than the 1928. With considerably more area under protection, the number of fires reported dropped from 200 to 180. The western district experienced an exceptionally favorable season, the number of fires being reduced to thirty-three, the lowest figure reported in years. Heavy and well distributed rains during the fall season were of great assistance in holding down the fire danger.

The 1930 spring season compares with the 1926 season, being one of the worst fire seasons experienced in the past fourteen years. At the close of the period precipitation for the State was below normal for seven consecutive months, the drought in some sections being critical. Fire hazards increased tremendously with the drought, fires being reported from the second day of January through the whole of the spring season. Both the mountain and eastern districts suffered particularly heavy fire losses in February, March and April. There were 2,784 fires reported from the



coöperating units, which burned over a total of 227,577 acres with an estimated damage of \$386,628. The whole field force directed their attention to fire suppression work and the central office force was greatly handicapped with the flood of fire reports requiring payment.

The following is a summary of fire statistics, law enforcement and other activities for the four fiscal years ending June 30, 1930:

FOREST FIRE STATISTICS FOR COÖPERATING COUNTIES—BY FISCAL YEARS

	1926-27	1927-28	1928-29	1929-30
Number of Fires by Classes:				
A—Under $\frac{1}{4}$ acre.....	19	58	48	51
B— $\frac{1}{4}$ to 10 acres.....	251	425	486	973
C—10 to 100 acres.....	401	487	560	1,487
D—100 to 500 Acres.....	345	156	142	402
E—Over 500 acres.....	75	19	22	51
Total.....	1,091	1,145	1,258	2,964
Causes of Fires:				
Brush burning.....	203	266	257	570
Hunters, fishermen and campers.....	120	138	111	176
Railroads.....	77	76	80	125
Lumbering.....	73	33	58	92
Incendiary.....	134	173	202	743
Smokers.....	113	174	232	498
Lightning.....	20	4	5	10
Miscellaneous.....	101	128	103	276
Unknown.....	250	153	210	474
Total.....	1,091	1,145	1,258	2,964
Area Burned—Acres:				
Merchantable timber.....	112,249	24,035	23,343	47,867
Reproduction.....	158,874	40,787	60,548	150,627
Open grass land.....	34,457	11,767	8,773	36,511
Total.....	305,580	76,589	92,664	235,005
Average area per fire—acres.....	280	67	74	79
Damage:				
Merchantable timber.....	\$ 285,765	\$ 38,072	\$ 47,253	\$ 108,861
Reproduction.....	296,607	78,103	94,881	259,143
Other.....	36,929	15,665	15,477	29,544
Total.....	\$ 619,301	\$ 131,840	\$ 157,611	\$ 397,548
Average damage per fire.....	\$ 567	\$ 115	\$ 125	\$ 134
Total fire fighting costs.....	\$ 19,814	\$ 10,925	\$ 12,818	\$ 26,239
Average fire fighting costs per fire.....	\$ 18.16	\$ 9.54	\$ 10.20	\$ 8.85
Law Enforcement:				
Number of prosecutions.....	93	157	73	203
Number of convictions.....	57	111	52	44
Number of acquittals, etc.....	29	46	19	57
Fines and costs.....	\$ 1,134	\$ 2,144	\$ 757	\$ 2,362

## FOREST FIRE STATISTICS FOR COÖPERATING COUNTIES—BY FISCAL YEARS—Cont

	1926-27	1927-28	1928-29	1929-30
Responsible Parties Apprehended:				
Number of parties billed.....	139	275	161	534
Number making payment.....	93	208	146	445
Amount received.....	\$ 1,198	\$ 2,300	\$ 1,476	\$ 4,095
Cost Paid by Landowners:				
Number of parties billed.....	17	20	7	56
Number making payment.....	15	11	7	35
Amount received.....	\$ 942	\$ 75	\$ 58	\$ 333
Volunteer Time:				
Number of men.....	4,841	3,064	2,640	4,356
Value of time given (20c per hour).....	\$ 6,294	\$ 2,424	\$ 2,096	\$ 3,263
Warden Activities:				
Number of hours worked.....	12,587	34,307	44,394	113,578
Mileage, car and on foot.....	62,565	82,792	195,029	345,797
Number of notices posted.....	10,732	10,624	11,407	18,737
Number of people interviewed.....	18,747	24,910	56,214	86,380
Number of sawmills inspected.....	469	746	893	1,507
Number of schools and meetings visited..	572	975	1,160	2,057

## FOREST PLANTING

Forest planting as a part of the forestry program of the States has two main functions: (1) the restoration of deforested or otherwise unproductive land to a state of profitable productivity; and (2) the education of the people, both old and young, by practical demonstration of the value of forest protection by stimulating their interest in the growing tree. At the present time this educational value is of first importance in North Carolina.

The policy of distributing forest tree seedlings to land owners at approximate cost of production has been working well. In spite of the scarcity of money, applications have increased in number and size.

During the fiscal year of 1929-30 the distribution exceeded that of the previous year by some 20,000 seedlings. But what is of more interest is that the number of individuals, schools and organizations applying for seedlings more than quadrupled over the previous year. This shows a more widespread interest in the work and in the long run will have a better educational effect than if a few coöperators took a much larger number of seedlings. The total distribution for this biennium summarized below is very nearly three times as large as for the previous biennium.

The plan to supply schools with seedlings free of cost in order to start small demonstration plantations inaugurated in the spring of 1928 has been continued. The interest in this project has made it desirable to increase the maximum number of trees allowed one school from 500 to 1,000. During the biennium some ninety-eight schools took and planted 35,366 seedlings. This policy of distribution to schools, endorsed by a number of school principals, will be continued, and increased efforts to make inspec-

SUMMARY OF DISTRIBUTION OF FOREST TREE SEEDLINGS BY THE STATE FOREST  
SERVICE FOR THE BIENNIAL PERIOD

	1928-29	1929-30
Loblolly pine, 1 year.....	66,850	50,727
Loblolly pine, 2 years.....	1,075	17,000
Shortleaf pine, 1 year.....	12,750	.....
Shortleaf pine, 2 year.....	.....	20,627
Longleaf pine 1 year.....	154,552	138,402
Longleaf pine, 2 year.....	.....	29,685
Slash pine, 1 year.....	5,187	12,339
Maritime pine, 1 year.....	2,440	600
Walnut, 1 year.....	405	7,611
Locust, 1 year.....	2,550	10,550
White pine, 2 and 3 year.....	12,650	2,186
Spruce.....	3,300	4,170
Scotch pine.....	4,500	1,500
Southern balsam, 3-1.....	16,100	13,200
Miscellaneous.....	1,623	190
Totals.....	283,982	308,787

tions of some of the school plantations and give recommendations as to their future care will be made. Work in forestry will also be taken up with the vocational schools, some 100 in number, and forest plantations started on their grounds as soon as possible, perhaps during the coming year.

Another means of reaching the public with sound forestry education has been through coöperation with the Forester of the State Agricultural Extension Service in supplying black walnut seedlings to 4-H Club members. During the season of 1929-30 some 7,611 black walnuts were sent to county agents and individuals. The majority of those trees went to two hundred and forty-seven 4-H Club members who were allotted small numbers of these trees by their county agents. With them were also shipped some walnut seedlings grown from seed produced at Mt. Vernon and Arlington. This demonstration in practical forestry has received much favorable comment. The 4-H Club members were also given the opportunity of getting other tree seedlings at a low cost from the State Nursery.

An offer was also made to Boy Scouts in the season 1929-30 similar to that offered to the schools. Eight Boy Scout organizations took 4,260 seedlings to be planted on their camp grounds or other demonstration areas. This work also will be expanded during the coming biennium.

Having no means of supplying tree seedlings suitable for planting in the mountain region of this State, an agreement was reached with the Champion Fibre Company of Canton, North Carolina, whereby they would supply from their nursery such tree species as they had at a reduced price if ordered through this Department. A total of 7,470 Norway spruce, 14,850 white pine and 4,500 Scotch pine seedlings was thus distributed, practically all in the Mountain region of this State.



## DISTRIBUTION OF FOREST TREE SEEDLINGS BY CLASS OF COÖPERATORS—1928-1930

	Number of Coöperators	Number of Trees
Farmers.....	119	368,805
Individuals and Companies.....	9	124,560
Schools.....	98	35,366
Boy Scout Organizations.....	8	4,260
Members of 4-H Cubs.....	250	8,321
State Institutions.....	3	8,195
Fort Macon State Park.....	1	6,462
Lake Rim State Forest.....	1	7,500
Mount Mitchell State Park.....	1	29,300
Totals.....	490	592,769

It is hoped that money will become available for a western nursery to supply farmers and other individuals with tree seedlings suitable for planting in the mountains.

While seedling production is the major nursery project, efforts are being continued to find the best stock for transplanting and to work out better methods of packing and seed sowing. A number of exotic tree seeds have been planted and the results are being carefully watched.

The State nursery facilities have been open to the new forestry school at State College and the professors have used the nursery for demonstration and experimental work. Trees have also been given to the Forestry School for their arboretum on Highway No. 10 outside of Raleigh.

Several demonstration plantings were undertaken during the period of this report. One at the North Carolina College for Women at Greensboro was participated in by some fifty students of the College under the supervision of Assistant Forester Claridge, while another near Raleigh on private property has proven valuable in showing the rate of growth and survival of different species of trees.

Inspections of areas to be planted, with advice as to species and methods as well as follow up inspections, have been made so far as time and funds would permit, and when the project itself seemed to justify such expense.

Coöperation with the U. S. Bureau of Plant Industry of Washington, D. C., was inaugurated in the project of experimenting with Asiatic chestnuts which may prove to be blight resistant. This is a timely enterprise as the chestnut blight has reached every county in the State where the chestnut naturally grows. Two hundred and fifty trees of this species were received in 1929 and 5,000 in the spring of 1930. Plans are being made for placing these trees on publicly owned lands in Piedmont and Eastern North Carolina. It is hoped that these trees will prove to be well adapted to the climate of North Carolina. Those planted last spring at Lake Rim State Forest have survived the transplanting and are doing well at the present time. Experimental plantings in the mountains will be made by the Appalachian Forest Experiment Station.

A number of experiments were started at the Lake Rim State Forest in the winter of 1929 with several species of trees and different ages of planting stock. Some interesting results should be obtained from these plantations, especially from the cork oak if it proves to be hardy in this climate.

The experimental planting at Fort Macon has been continued with 6,462 trees planted during the biennium. Many of the plantations have so far shown very good results, some of the trees having at the present time reached a height of over three feet. Some experiments, which have attracted attention outside the State, are now being made with sea oats with the intention of fixing the forward dunes. This question of controlling the blowing sand along our 300 miles of shore line will assume increasing importance, and enough money to start experiments on this small though eminently suitable area should be made available as soon as possible.

The annual spring planting on Mount Mitchell State Park resulted in the setting out of 29,300 trees, mostly southern balsam. Mr. Claridge has experimented with different ages and conditions of balsam stock and some interesting results have been secured. An article by him on this subject was recently published in the Journal of Forestry. A total of some 55,000 trees have been planted to date, but there remains much more to be done since 75 per cent of the total area of the park was originally cutover and most of this area was also burned.

Some improvement plantings have been made at the Frank Stedman Fish Hatchery, Fayetteville, with sixty-two ornamental trees; while some sixty-five ornamental trees and shrubs were planted about the house and pens at the State Game Farm. These plantings should be added to each year in order to continue the beautification of these places. At the Stedman Hatchery the banks of Bones Creek were washing badly and some 900 willow cuttings were planted at the stream level in order to bind the soil and keep down the expense of maintaining the banks of the stream.

The volume of correspondence and calls for advice on all phases of technical forestry have increased considerably. On planting subjects alone some 250 communications were answered. A great many of these letters required detailed advice which took some time in preparation. To facilitate replies to the planting inquiries a one page circular letter was prepared called, "Planting Hints."

The negotiations for an additional five acre tract of land at the Clayton nursery are at a standstill due to the difficulty of securing a clear title to the land. The budget item of \$500 for this purpose is being carried over into the next fiscal year with the hope that the difficulty may be overcome so that expansion of the nursery work may continue.

*Highway Planting.* The Department has been called upon a number of times to help direct, and in some cases, to undertake roadside planting projects. While the protection of existing trees and the careful preservation of small trees already started along the roads will take care of many situations, highway planting will be necessary, not only for its own sake, but as a strong appeal to the public. Coöperation in this work is demanded by Women's Clubs, civic organizations, and municipalities and an effort has been made to respond so far as possible. After two years experience, the conclusion has been reached that without a central authority to direct high-



way planting much of the effectiveness of these plantings is lost. In co-öperation with the State Highway Department which supplied labor to dig holes for the trees, some four miles of highway were planted between Garner and Clayton. One hundred and ninety-five trees, mainly oaks, were planted on this stretch. A survival of about 86 per cent was obtained the first year. This percentage being reduced during the succeeding years due to the vandalism and carelessness of farmers owning the abutting property. At the present time the trees which have survived are doing well. In co-öperation with the American Business Club of Raleigh which supplied funds for the work, some 566 trees and shrubs have been planted on the boulevard on Highway No. 10 going west from Raleigh. This club has showed considerable interest in this work and much favorable comment has been heard about the project. Governor McLean in 1929 and Governor Gardner in 1930 each planted a tree on this stretch of highway.

The survey made by Mrs. W. L. Lawton, Chairman of the National Council for the Protection of Roadside Beauty aided by the American Nature Association, has greatly stimulated interest in highway beautification in North Carolina. The published results of this survey entitled, "North Carolina Roadsides," is one of the best reports on the rural billboard question available for any state. Mrs. Lawton was greatly helped while in this State by the Forestry Division.

## STATE PARKS AND FORESTS

The rapid increase of public interest in State parks and forests is one of the outstanding developments of the past biennium. Outside of the publicity and educational work conducted by this Department, there are a number of features which have contributed to the present interest in State action in the acquisition and development of recreational areas and in the protection of our natural scenery. Among these are the gradual absorption of our bathing beaches by development companies or private parties which may eventually exclude the public; the almost entire exclusion of the public from our migratory water fowl shooting grounds on the marshes and sounds of the State by wealthy shooting clubs; the encroachment of private game preserves on the areas surrounding State game refuges and the taking over by commercial enterprises of many of the most outstanding scenic features of the State. The growing number of visitors from all parts of the country driving over our good roads in search of desirable stopping places and seeking out the best scenery and most desirable recreational facilities make us realize that the development of these areas is an economic asset which can rapidly be developed into one of our most important and most productive industries. This awakening has been shown in the popularity of the campaign to secure the establishment of the Great Smoky Mountains National Park in spite of the fact that in aiding its establishment the State was giving two million dollars worth of land to the Federal government. The insistent demand that the State secure Linville Gorge as a State park is another sign of this feeling and a resolution recently endorsed by one of our leading outdoor organizations asking for the acquisition of Grandfather Mountain as a State park only emphasizes this trend in public opinion. An appropriation or an authorized bond issue to



inaugurate a definite and progressive acquisition policy would, it is believed, be one of the most popular steps the Department could take in spite of the almost universal desire to reduce unnecessary expenditures.

Administration of the State parks and lakes already acquired takes into consideration first of all the welfare of the local people and the public generally, and it is with the idea of making these areas of greater use to the people that the small appropriation available is expended.

*Mount Mitchell State Park.* This State park purchased under a law in 1915 which carried an appropriation of \$20,000 for the purpose is the only park with a full-time warden. His duties are first of all to help the twenty-five to thirty-five thousand visitors who ascend Mount Mitchell each summer. During the spring and fall he acts as lookout in our fire control organization. It is planned shortly to build him a garage where he may keep a supply of firefighting tools as well as his car to be ready at a moment's notice to start for any fire which may threaten the park or the adjoining Mount Mitchell Game Refuge.

Owing to a heavy sleet and consequent windfall during the winter of 1928-29, the large amount of dead and down spruce and balsam timber has brought about a serious fire hazard on the park. To eliminate that so far as possible two contracts were let in 1929 to cut the wood and sell it for pulpwood. This will remove only the larger timber, but the brush will remain a serious hazard for a number of years. It is hoped that natural reproduction will soon take the place of this fallen timber. If this fails, the plans for planting will extend to this area.

*Fort Macon State Park.* The park warden at Fort Macon has been employed only during the summer and then only on part time. It is very necessary that proper protection be given the old fortress since such protection was guaranteed under the title to the property given to the State by the War Department. The chief feature of interest has been the accrual of a large point of land on the eastern end of the island which the Attorney General has declared is the property of the State and cannot be alienated by entry. Experimental planting has been carried on and pine trees on the areas surrounding the Fort have shown excellent growth. An attempt is being made so far as funds are available to hold the new land by planting sea oats along the beach and gradually building up the area into sandhills. In coöperation with the Engineering Division it was proposed to stretch a length of wire fence along the lowest part of the ridge so that wind and tide will work to build up a beach upon which the sea oats will flourish. If this could be done, not only would a very interesting and valuable area be added to the State park, but something at least would be done to stabilize the channel through which commerce enters Bogue Sound. Unfortunately, funds for this are not yet available.

*Miscellaneous Areas.* Rendezvous Mountain, a tract of 140 acres in Wilkes County donated by Judge T. B. Finley, will be used next spring for an experimental planting of Chinese chestnuts where our native chestnuts have failed to resist the chestnut blight disease. On account of the cut in appropriation, the projected trail has not been undertaken.

Through the will of Mrs. Elizabeth Coit two areas of 100 acres each on Wine Spring and Wayah Balds in Macon County were left to the State in 1929. These tracts are surrounded by national forest lands and as yet no disposition has been made of them. They are too small to handle as a State park and sooner or later it may be advisable to exchange them with the Forest Service for an area better adapted to State use.

The Lake Rim Forest, acquired for the protection of the Frank Stedman Hatchery near Fayetteville, will be largely devoted to experiments in forest management and forest planting. Already planting has begun and it is expected that species especially suitable for food for game and the protection of the streams will be used in planting this forest. Some additional lands should be acquired for the better protection of the lake.

*State Lakes.* Everything points to the general satisfaction of the local people and the general public with the administrative measures already put into effect on Waccamaw and White Lakes.

While prior to 1929 only those constructing new docks were required to take out permits, during last year all docks and other buildings had to be operated under permit. This change was brought about with very little friction and with general acceptance by those claiming the docks. It has also been found advisable to require permits for the operation of boats on these two much frequented lakes and license plates similar to, though smaller than those on automobiles, are provided to be fastened on each licensed boat. An additional fee is charged for boats used for commercial purposes. Through frequent and cordial contact with the users of the lakes, they have learned that the Department in making regulations is working for the benefit of all. A recent stir-up about the launching of a large passenger boat on White Lake was settled without difficulty through the fair and impartial attitude of this Department as represented by Mr. Claridge who investigated this affair.

In coöperation with the Inland Fisheries Division regulations have been made to improve fishing conditions in White and Waccamaw Lakes. Breeding grounds and special closed seasons for breeding have been set aside and special regulations made with the object of increasing the number of sport fish of these lakes. Last fall an almost unanimous request from a large proportion of the local people was made that they be allowed to use trot lines in Waccamaw Lake during the three winter months from November 1 to January 31. After a full public hearing, such fishing was allowed under special permit for about six weeks in order to determine whether the claim was justified that this practice would reduce the number of scavenger fish. Judging by reports required of the permittees, around 80 per cent of the fish caught were undesirable and only 20 per cent were sport fish. This supported the contention of some authorities that by allowing local people this privilege an increase rather than a decrease in the sport fish would result. It is expected to carry this experiment on again during next winter. There are now part-time lake wardens on both Waccamaw and White Lakes, but full-time men should be employed the year round in the future.

The question of gradually removing all closed structures from over the State lakes will shortly come to the front. Waggaman Pavillion on Wac-



camaw Lake, leased by the owner to Jack Smith last spring, suffered from a storm which destroyed a dock connecting it with the shore. Its sanitary conveniences were also put out of business by a fire which destroyed the Waggaman Hotel. In spite of an agreement to put the building in good condition it is now closed by the Health authorities. Its removal to some site on the land would do away with a source of water pollution which is almost beyond our control. On White Lake an old bath house and pavillion at Melvin Beach is so rotten that the owner has closed it for the summer. A new one has been built on the land and the old building will be removed. The policy of the Department now is to allow no more closed buildings over the lake.

The value of Waccamaw Lake as a recreation area has been greatly improved by the dam built across its outlet under appropriation of the General Assembly of 1925; in fact, its attractiveness as a bathing, boating and fishing resort can almost be said to depend on maintaining the lake level at a fairly constant stage. Owing to the difficulty of the situation and the necessarily cheap construction of the wooden dam, there have from time to time occurred serious leaks. These have heretofore been stopped at the expense of this Department or with the assistance of the local people, chiefly represented by Mr. K. Clyde Council. A bad leak has recently occurred (June 27, 1930) at the east end of the dam which was promptly inspected by Mr. Charles E. Ray of the Engineering Division who recommends the immediate use of sand bags. With no funds available the Department has had to call on the local people to make this necessary repair.

The Engineering Division strongly recommends the construction of a new and permanent dam at a cost of perhaps \$10,000 to be made available through special legislative enactment providing for an appropriation and county or other local coöperation.

In the spring of 1929 the issue was forced upon the Department as to whether the State had any claim over Baker's Lake in Bladen County. After careful investigation of the records it was found that the land surrounding and including Baker's Lake was granted to private parties prior to 1828 and was therefore legally in the possession of the grantees and their heirs. This is only a small lake but could be made an excellent fishing lake, and since it is within an hour's drive of Fayetteville, it is one of the areas which might with advantage be acquired by the Department as a State forest, State park or game refuge, the land to be used as a State forest and the water as a desirable fishing ground.

Following the attempt of a local man to place an entry upon Jones and Salters Lakes these two lakes were surveyed by the Engineering Division of the Department and found to contain areas of 227 acres and 322 acres respectively. This led to the passage by the General Assembly of the law preventing the alienation of any State lakes over 50 acres in extent. Under this and other laws it seems probable that not only the Bladen County lakes, but also Phelps, Alligator and Pungo Lakes in the Albemarle region belong to the State and should be administered by this Department.

### GENERAL FORESTRY

There are a large number of activities coming under the general head of forestry outside of the specific problems of forest fire control, forest plant-



ing, and the administration of State parks and forests. These may be roughly included under education, investigation, legislation, and coöperation; however, they all are designed to gradually bring about a permanent policy and practice of forestry and conservation for the State, and to aid land owners and manufacturers of timber products in the production and disposal of their materials.

To secure permanent results, it is essential that the rising generation be thoroughly grounded in conservation so that their attitude towards the forest will be one of protection rather than destruction. In order to reach the public in as many ways as possible with convincing evidences of the importance of the subject, various investigations are necessary. These are in many cases carried on through coöperation with other States departments or agencies, with the Federal government or with civic organizations and private individuals. Such studies together with the experiences gained in the administration of the work, frequently show the need for additional or changed legislation, which from time to time is being proposed in order to bring about more favorable conditions and better protection to public property. No avenue is left unused so far as funds and personnel will permit through which to carry the lessons of conservation and by which the State's property and the interests of the people may be conserved.

*Education.* Carolina Forest Week is an annual occasion for intensive forestry publicity and education. Prior to 1929, Forest Week was observed nationally as American Forest Week. For various reasons the participation of the Federal government was discontinued and many states observed their own Forest Week. North and South Carolina joined together in observing Carolina Forest Week during the third week in March of 1929 and 1930. Arbor and Bird Day in North Carolina thus became a part of our Forest Week observance.

The idea is to carry a definite message through the schools and the adult organizations to every person in the State. Special school programs are advised, often accompanied by tree planting. The coöperation of the civic clubs is sought and the local newspapers in many cases have entered heartily into the plan and furnished a vast amount of free publicity. The three broadcasting stations have granted the Department free facilities for daily programs during the week. Coming as it does near the spring fire season, and sometimes in the midst of it, this observance is calculated to reach the children and the grown people at a most opportune time.

The programs were entered into with more enthusiasm than at any time in the past, particularly through the schools and the press. The severe 1930 spring fire season, however, prevented the field force from carrying out its portion of the work to the fullest extent. Among other activities carried out during Carolina Forest Week in the two years 1929 and 1930 were programs by teachers and children at some 536 schools, 475 talks, illustrated lectures and motion picture shows given, 116 window displays placed, 27,000 pieces of printed matter distributed and wide publicity from the local press.

At the suggestion of the American Forestry Association which furnished prizes in the form of three bronze medals, an essay contest in the high

schools of the State was conducted in the spring of 1930 with very gratifying results. Contesting essays which had been judged the best in their respective counties were submitted from some twenty-three counties. Twenty-five dollars was divided into six cash prizes, and seven girls and one boy in various parts of the State were awarded prizes of medals at their school commencements. The subject selected was, "Develop a Suitable Woodland Taxation Policy for North Carolina." Forty-five essays were submitted to this office and probably five times that many essays were prepared by the school children. Every high school in the State was invited to take part in the contest and information in printed and mimeographed form was sent out to hundreds of the schools. The publicity and information conveyed to the young people of the State, and through them to their elders, will no doubt contribute very materially to the success of the Constitutional amendment which is to be voted on next November. A similar contest on some other subject will be carried on next year and probably in following years.

The present force accepts every possible opportunity of making addresses, giving illustrated lectures and making contacts with young and old. Talks, moving pictures and instruction are being given at boy's and girls' camps and especially at teachers' summer schools so far as time and money have allowed. Last summer nearly half of the camps and summer schools were reached while the other half were disappointed in having no one there. This summer a rather more restricted program has been necessary. An extension of this work to every teachers' summer school and every boy and girl camp should be made.

The importance of this educational work cannot be over emphasized. Request has been made that a definite message of forestry be carried into the one hundred vocational schools of the State with the possible establishment of a forest plantation in connection with each. The Boy Scouts and similar groups are asking for all the instruction we can give. The establishment in the schools of conservation clubs, Forest Guides, and such active organizations offers a wide and fruitful field for the services of a specialist. Last year such an educational man was engaged, but his appointment was cancelled on account of the cut in appropriations.

An important feature of the educational work in forestry is in answering correspondence and in preparing articles and addresses for all sorts of audiences. It is not only necessary to know the forest conditions and needs of North Carolina, but to keep up with what is being done to meet similar needs in other states and countries. The necessity of having readily available reports, books of reference, pamphlets and clippings emphasizes the value of a conservation library. Provision should be made at the first opportunity for a suitable room and a competent librarian or file clerk so that each Division could have ready access to the information it most needs.

With the resignation of Mr. H. M. Curran from the State Department of Agriculture and his leaving the State, an important part of the work which he was doing; namely, the study of the timber markets and the advising of owners of small timber tracts as to uses and markets, is falling upon this Department. This is only proper since it is certainly the duty of the State Forest Service to furnish such information to the people of the State. At present we have no specialist to whom such appeals can be referred and no



fund to pay the expenses of an examining agent. The employment of an expert in the harvesting and sale of forest products would be of great value to the land owners of the State as well as to the wood using industries in the location of their timber supplies.

*Investigations.* The last General Assembly (Chapter 282, Public Laws of 1929) authorized the study of various types of lands with the object of recommending to the Governor possible State action to protect or acquire such areas for the benefit of the public. Unfortunately, no appropriation was made to carry out this provision, and with the cut in revenue, little opportunity has been found to prosecute this study as it deserves. Information has been gathered from time to time, however, without additional cost to the State and such information will be presented in the form of a preliminary report "with recommendations to the Governor and the next General Assembly" along the lines required by this measure.

The study of timber resources, begun in the spring of 1928, was completed that same year and part of the information secured has been incorporated in the publication, "Resources and Industries of North Carolina," which was compiled and edited by the late Park Mathewson. The estimates on the remaining standing timber are no doubt conservative, and being the best available they will be used until more reliable figures can be secured. These estimates show a total stand of about thirteen and a half billion board feet of merchantable saw timber on the 21,056,400 acres of woodland (forest) area of the State, or an average of 634 board feet per acre.

The results of the survey of nonutilized wood carried on during 1928 in coöperation with the Committee on Wood Utilization of the U. S. Department of Commerce were worked up by that Committee under the direction of Dr. Axel Oxholm. The published report entitled, "Survey of Nonutilized Wood in North Carolina" toward the cost of which this Department contributed, is being distributed by both coöperating agencies. This report shows "that approximately 33,000 carloads of nonutilized material are annually available for sale." Much of this material, however, consisting of sawdust, slabs, edgings, etc., is so remote from cheap transportation and has so little present value that it could only be handled at a loss unless some special use could be found for it. It is with the object of bringing producer and possible consumer together that this study was made.

North Carolina has been very fortunate in that the United States Forest Service decided to make its final state study of forest taxation here. Three counties, Macon, Chatham, and Beaufort, were selected, with the possibility of a fourth, and the work was put in local charge of Mr. Paul Wager of the University of North Carolina. This study has been carried on without cost to the State during the spring of 1930 under the direction of Mr. R. C. Hall of the Forest Tax Commission of the U. S. Forest Service. Mr. Wager has been assisted by Mr. R. B. Thompson, a forest taxation expert, who made a similar study in Oregon. This study has been supplemented by the Southern Forest Experiment Station which carried its economic study of "the financial possibilities of growing southern pine" into Beaufort County in charge of Mr. W. E. Bond. These counties were selected not only as representative of the region, but also because the county land and tax



records were in such shape as to justify the study. In this study this Department has been consulted at every step and close coöperation has been maintained, not only with us, but with the State Tax Commission. The results should be extremely valuable to the State of North Carolina in its effort to lighten the burden of taxation on the farmers and other timber land owners. If the studies in one or all of these three counties bring out information which will be of value to the people of North Carolina, it may be advisable to publish a small report on this investigation.

As a part of the coöperative study undertaken by the Water Resources and Forestry Divisions of the Department, a study was made of the surface conditions of three watersheds tributary to the Durham city watershed on which stream flow and silt determinations will be made continuously for a period of years. The map made as the result of the surface study will form a basis of comparison of the three areas which show different percentages of forest growth on the three areas. Some interesting results on erosion and stream flow may be expected.

*Coöperation.* In addition to the financial coöperation received from the Federal government, from counties, and from private individuals in forest fire control and forest planting, the Department has coöperated as fully as possible with such organizations as the Southern Forestry Congress, the North Carolina Forestry Association, the North Carolina Social Service Conference, the Appalachian Forest Research Council, the National Conference on State Parks, the Association of State Foresters, the American Forestry Association, the American Tree Association, and similar associations through which it has been possible and advisable to convey strong conservation messages to our own people. Travel to meetings outside of the State has been used conservatively and has been incurred only where the best interests of the work and of the State have been carefully considered. It is only through free and active coöperation with every agency engaged in similar work that we can hope to bring about a permanent consciousness favorable to the conservation of our natural resources.

*Legislation.* The effort to secure favorable legislation is often unsuccessful because there is little demand for it from the people back home who are represented by the members of the General Assembly. When any piece of legislation seems to be necessary, it is advisable to convince the people of its value. If the demand comes from the public rather than from the Department, its success is assured.

The principal measures considered and acted upon by the General Assembly of 1929 relating to forestry and the use of the land were as follows:

1. To prevent the alienation of State lakes having an area of 50 acres or more. (Chapter 165, page 41, Conservation Laws.) This makes sure the State tenure of Jones and Salters Lakes in Bladen County and is a necessary step toward the administration of Phelps, Alligator, and Pungo Lakes.

2. Providing for the special study of the forest, cutover, open, and shore land of the State. (Chapter 282, Public Laws of 1929.) This has been referred to on a previous page.

3. Amending Section 8057, Consolidated Statutes, to provide for the acquisition by the Federal government of land in eastern North Carolina for the establishment of national forests. The first examination of lands for this purpose resulted in an unfavorable report by the United States Forest Service on the ground that desirable lands were held too high and that low priced lands contained too large a proportion of swamp or pocosin lands. A further investigation it is understood will soon be made.

4. To authorize the United States to acquire land for bird sanctuaries and refuges. It was felt that this measure would call the attention of the Federal Government to the desirability of establishing a Federal wild fowl refuge in eastern North Carolina, possibly at Mattamuskeet.

5. Two measures were introduced relating to the possible adjustment of taxation on forest lands. On the recommendation of the legislative committees it was decided to coöperate with the State Tax Commission in urging the passage of the bill prepared by it providing for putting a Constitutional amendment before the people. This bill was enacted into law and will be voted upon next November.

Two county laws were passed in which the Forestry Division was keenly interested. The Onslow County Forest Fire Law allowing the free burning of woodland during the winter was not approved and an effort was made to prevent the enactment of this exception to the State-wide Forest Fire Law.

The Burke County Law to prevent the stealing of evergreens and removing them from the State was approved so far as it went. A more general law protecting trees, shrubs, and flowers along the highways and preventing the despoilation of any private property would have an excellent effect if some feasible means was found for enforcing it.

DIVISION OF FORESTRY RECEIPTS AND DISBURSEMENTS  
Biennial Period Ending June 30, 1930

Forest Fire Prevention		1928-29	1929-30
401	Salaries and Wages.....	\$ 25,865.96	\$ 36,300.55
402	Supplies and Materials.....	1,631.72	1,202.31
403	Postage, Telephone, Express and Freight.....	2,287.43	2,111.31
404	Travel Expense.....	6,298.36	7,078.46
405	Printing and Binding.....	2,182.48	1,306.90
406	Motor Vehicle Operation.....	4,369.03	3,928.40
407	Lights.....	25.45	9.67
408	Repairs.....	115.55	97.36
409	General Expense.....	2,233.92	1,455.18
410	Equipment.....	16,998.36	4,199.93
411	Forest Fire Prevention (45 Coöperative Projects):		
411-1	Salaries and Wages, 1,000 Forest Wardens in 45 coöperative projects. 1 County Warden in each project. Average 20 District Wardens in each coöperative project.....	32,013.08	25,151.87
411-2	Salaries and Wages, Forest Wardens and Laborers (fire fighters) in 45 coöperative projects. Fire suppression only (fire fighters receive 20c per hour).....	9,901.23	20,979.40
411-3	Travel Expense, 1,000 Forest Wardens (Expense car mileage at 7c per mile).....		6,502.02
411-4	Lookout Towers.....		2,506.92

## DIVISION OF FORESTRY RECEIPTS AND DISBURSEMENTS—Continued

Forest Fire Prevention	1928-29	1929-30
411-5 Cabins.....		\$ 248.16
411-6 Telephone Lines.....		1,588.12
411-7 Miscellaneous Fire Fighting Equipment.....		3,764.69
General Forestry:		
412 Salaries and Wages.....	\$ 4,689.68	3,351.66
413 Supplies and Materials.....	337.52	97.71
414 Postage, Telephone, Express and Freight.....	160.62	239.98
415 Travel Expense.....	817.14	566.07
416 Printing and Binding.....	596.66	258.92
417 Motor Vehicle Operation.....	228.53	69.62
418 Equipment.....	96.26	94.05
418-1 General Expense.....	99.75	30.00
Parks:		
419 Salaries and Wages.....	3,430.06	2,660.59
420 Supplies and Materials.....	399.62	20.35
421 Postage, Telephone, Express and Freight.....	3.05	69.80
422 Travel Expenses.....	242.72	273.02
423 Printing and Binding.....	53.90	33.00
424 Motor Vehicle Operation.....	18.83	14.31
424-1 Equipment.....	76.19	126.25
Planting:		
425 Salaries and Wages.....	4,476.35	6,991.78
426 Supplies and Materials.....	757.33	892.72
427 Postage, Telephone, Express and Freight.....	91.99	191.89
428 Travel Expense.....	63.99	151.97
429 Printing and Binding.....	12.65	27.04
430 Motor Vehicle Operation.....	268.91	377.85
431 Equipment.....	51.41	577.86
Highway Planting.....	900.00	.....
Repairs, parks.....	590.17	.....
General Expense, parks.....	2.50	.....
General Expense, planting.....	5.81	.....
Insurance.....	49.71	.....
State Fair.....	200.00	.....
Total Expenditure.....	\$122,643.92	\$135,547.69
Less Receipts.....	78,111.88	72,045.09
Appropriation.....	\$ 44,532.04	\$ 63,502.60



## DIVISION OF GAME

CHAS. H. ENGLAND, *State Game Warden*

MRS. ALICE W. BRADLEY, *Stenographer*

C. L. BEDDINGFIELD, *Chief Clerk*

MRS. LILLIAN BRICKHOUSE, *Clerk*

### *Introduction*

There is a Biblical assertion to the effect that in the beginning of the world man was given dominion over the fowl of the air, the fish of the sea, and the wild beasts of the field, with authority to use them for his comfort and pleasure. For a while, a condition of plenty prevailed and man made use of these resources without let or hinderance. As time passed and governments were established, the extreme individuality of mankind was soon lost, and supervisory rights over the wild life were vested in rulers and governments.

In North Carolina, the sovereignty is vested in the people and our Supreme Court has declared that the game and other wild life of the State is the property of all the people of North Carolina.

*Need for Game Protection.* If we are to have for ourselves and to preserve for future generations the valuable resources afforded by our wild life, practical conservation methods are necessary. Business practices are essential. We must follow a proper program and definite policies.

The North Carolina Game Law was passed by the General Assembly of 1927. It recognizes the interests of the people in the wild life of the State and establishes a policy under which the public rights in this common property are protected. From a practical angle, the law creates the machinery for carrying out its purposes, prescribing the course of action that its administration must follow.

*Law Enforcement.* That public sentiment has constantly and rapidly crystalized in favor of a rigid enforcement of the game law can be conclusively shown in several ways. Each succeeding year the number of convictions obtained has consistently increased, due to increasing support of the general public in reporting violations to the wardens and willingness to appear as witnesses. The records show that the courts are steadily imposing larger fines and severer sentences on convicted violators. Sheriffs and all peace officers designated as ex-officio wardens in the law are showing more interest and willingness to prosecute game and fish violations, largely as a result of insistent demand of the general public that the laws be enforced.

There is a strong sentiment, steadily growing, to increase the reward from \$5.00 to \$10.00 offered in the law for evidence to convict game law violators.

During the period extending from July 1st, 1928, to June 30th, 1930, a total of 3,415 convictions have been obtained for violations of the State Game Law. While no comparison for a previous biennium is available since

the law was in effect only one year previous to this report period, the number of convictions for the first year of operation of the State Game Law was only 875. The total of fines and costs assessed against game law violators was \$34,863.00 over the two year period.

The State Game Law provides that hides or furs taken or held in violation of the statute shall be seized and disposed of under specific requirements. Under these provisions, seizures have been made of hides and furs in eight counties during the biennium. These were sold, according to the law, and brought a total of \$498.30.

It is also provided by the State law that game may not be held in captivity except under special permit from the Department of Conservation and Development. The public has shown an especial liking for fawns, seven of which being held illegally were confiscated during the biennium, most of which were released on State Game Refuges. One bear was also released during the period after confiscation.

Interest in game from an educational and scientific viewpoint is shown in the fact that 23 permits have been granted during the two-year period for the taking of game for these purposes. These permits are issued mostly to zoology and biology classes in public schools and colleges and to scientific institutions.

*Warden Service.* The warden organization consists of the State Game Warden, three District Wardens, and a County Warden in each county in the State, with the exception of Dare and Hyde Counties. The County Warden of Beaufort County also serves as warden in Hyde County. R. B. Etheridge, board member, with the assistance of the sheriff of the county, and other ex-officio game wardens named in the law, has handled matters in Dare County.

The annual salary of each of the District Wardens is \$2,000, with a travel allowance not in excess of \$1,350 a year.

The annual salary of the County Wardens, which includes travel expense, ranges from \$850 to \$1,200, with an additional twelve and one-half cents for each license sold in his county. If the game and fish warden is also a forest warden, his salary is larger.

Each county warden has secured for appointment by the State Game Warden from six to forty interested persons in his county to serve as special deputy wardens without pay from the Department. An inestimably valuable service has been uniformly rendered throughout the State by these special wardens, without compensation from the Department.

High praise and commendation are due the District and County Wardens for the untiring effort, faithful, intelligent and impartial service rendered.

*Propagation of Game.* The best thought and highest authority engaged in game restoration and advancement agree that the introduction of new blood is advisable and necessary even in sections where the breeding stock is more or less adequate. This opinion is backed by the experiments and tests made by the Biological Survey and other game propagating agencies in the several states. It seems to have been established beyond a doubt that the infusion of new blood increases the vigor, vitality and productiveness of the local breeding stock.



Under the Game Division budget for the present biennium, beginning July 1st, 1929, and ending June 30th, 1931, approximately twenty-five per cent of the total estimated game fund receipts was asked for and allowed by the budget to be spent for game propagation for each fiscal year of the two-year period. This money is spent in three ways: First, operation of the State Game Farm; second, establishment, maintenance and protection of State and County Game Refuges; and third, the purchase of game. See financial statement for first fiscal year of biennium for amount spent in each of these ways. Also see subsequent tables for game raised, purchased and released.

*Game Farm.* The State Game Farm was completed and opened about April 1st, 1928. Despite the late start, it did well that year. During the second breeding season, of the spring of 1929, improvements were made and results obtained were satisfactory. At the beginning of the present budget biennium, July 1st, 1929, the State Game Farm was placed strictly upon its own budget. Therefore, during this year, or the third breeding season now on, the cost of the operation of the farm and cost of all game per head that is raised can be estimated in advance and determined accurately at the close of the season.

The value of the operation of the State Game Farm as an educational medium for game advancement and propagation cannot be over-estimated. Hundreds of people visit the farm weekly and a personal inspection and better understanding of the State's undertaking arouses in them a coöperative support and interest that perhaps otherwise could not be as fully obtained. See subsequent table for species of game and numbers of each species used as breeders at Game Farm.

#### INVENTORY OF GAME AT ASHEBORO STATE FARM

Quail:	
Parent stock or breeding quail.....	492
Young quail already hatched.....	976
Number of quail eggs now setting.....	1932
Proposed production for season.....	4000
(Percentage of fertility, 95)	
Pheasants:	
Parent stock or breeding Ringneck Pheasants.....	465
Young Ringneck Pheasants already hatched.....	1786
Number Ringneck Pheasant eggs now setting.....	100
Proposed production for season.....	2000
(Percentage of fertility, 75)	
Turkeys:	
Parent stock or breeding turkeys.....	20
Young turkeys already hatched.....	97
Number of turkey eggs now setting.....	60
Proposed production for season.....	125
(Percentage of fertility, 52)	

Miscellaneous game birds and animals for exhibition purposes now at the farm consist of Lady Amerst, Reeves, Golden and Silver Pheasants, Mourning Doves, Coons, Opossums, Fox and Grey Squirrels, Rabbits of several species, etc.



## RINGNECK PHEASANT EGGS—DISTRIBUTION BY COUNTIES—SEASON, 1930

County	Number Settings	County	Number Settings
Alamance.....	35	Jones.....	8
Alexander.....	11	Lee.....	5
Alleghany.....	57	Lenoir.....	12
Anson.....	54	Lincoln.....	15
Ashe.....	6	McDowell.....	20
Avery.....	8	Macon.....	12
Beaufort-Hyde.....	19	Madison.....	15
Bertie.....	3	Martin.....	16
Bladen.....	16	Mecklenburg.....	36
Brunswick.....	9	Mitchell.....	6
Buncombe.....	29	Montgomery.....	17
Burke.....	12	Moore.....	19
Cabarrus.....	18	Nash.....	18
Camden.....	7	New Hanover.....	4
Caldwell.....	12	Northampton.....	19
Carteret.....	6	Onslow.....	9
Caswell.....	4	Orange.....	18
Catawba.....	9	Pamlico.....	3
Chatham.....	29	Pasquotank.....	6
Cherokee.....	18	Pender.....	9
Chowan.....	7	Perquimans.....	1
Clay.....	14	Person.....	8
Cleveland.....	40	Pitt.....	9
Columbus.....	28	Randolph.....	59
Craven.....	12	Richmond.....	11
Cumberland.....	33	Robeson.....	31
Currituck.....	1	Rockingham.....	37
Davidson.....	36	Rowan.....	16
Davie.....	17	Rutherford.....	11
Duplin.....	23	Sampson.....	3
Durham.....	14	Scotland.....	14
Edgecombe.....	19	Surry.....	21
Forsyth.....	57	Stanly.....	23
Franklin.....	24	Stokes.....	9
Gaston.....	32	Swain.....	9
Gates.....	9	Transylvania.....	20
Graham.....	7	Tyrrell.....	2
Granville.....	22	Union.....	33
Greene.....	2	Vance.....	6
Guilford.....	60	Wake.....	40
Halifax.....	22	Warren.....	12
Harnett.....	5	Washington.....	3
Haywood.....	60	Watauga.....	12
Henderson.....	47	Wayne.....	13
Hertford.....	1	Wilkes.....	29
Hoke.....	15	Wilson.....	9
Iredell.....	26	Yadkin.....	20
Jackson.....	9	Yancey.....	4
Johnston.....	38		

PHEASANT DISTRIBUTION  
From July 1, 1928, to June 30, 1930

1. Original stock at Game Farm, 1928.....	102
2. Raised at Game Farm, 1929.....	172
3. Adult pheasants purchased fall of 1929:	
Mrs. E. C. Blair, Teer, N. C.....	55
S. H. Black, Bessemer City, N. C.....	84
J. J. Larew, Mocksville, N. C.....	60
Walter E. Wells, New York.....	100
Fox Hollow Corporation, New York.....	318
Total.....	891

## DISTRIBUTION

1. Young pheasants distributed fall of 1929.....	172
2. Adult pheasants 1929-1930.....	215
Total Distribution.....	387

## QUAIL DISTRIBUTION

From July 1, 1928, to June 30, 1930

1. Quail reared at Game Farm season 1929.....	2,160	
2. Quail purchased from Mexico season 1929.....	4,000	
3. Quail distributed during the year 1929.....	6,160	
Total.....	6,160	6,160
4. Quail purchased from Mexico season 1930.....	6,000	
5. Quail distributed during the season 1930.....	6,000	
6. Quail purchased for State Game Farm for 1929 and 1930.....	600	
Total purchases and quail raised for the two-year period.....	12,760	
Total distribution for two year period.....	12,160	

Remarks: Virtually all quail reared at the Game Farm were released when about half-grown in the state and county refuges. The distribution in each refuge was based on size of refuge and local conditions.

All quail purchased were released in protected covers, with each county receiving practically the same number, and receipts taken by the county wardens from the owners of the land in which the quail were liberated.

Pheasants were released almost exclusively in protected covers and game refuges where they will receive special attention. They were released in large groups ranging from 8 to 40. Three city zoos were supplied with pheasants as part of the department's educational program.

## TURKEY DISTRIBUTION

From July 1, 1928 to June 30, 1930

Brood stock Game Farm, spring 1928.....	46	
1. Young turkeys raised at Game Farm, summer 1928.....	76	
2. Adult turkeys purchased, fall 1928 and early 1929.....	278	
3. Young turkeys raised at Game Farm, spring 1929.....	72	
4. Adult turkeys purchased season 1929-1930:		
Gaston County by Warden.....	4	
Lincoln County by Warden.....	4	
Cumberland County by Warden.....	5	
Cumberland County by Warden.....	18	
Person County from Noell.....	14	
Beaufort County by Warden.....	16	
Beaufort County by Warden.....	19	
Total.....		552
1. Young turkeys released in county refuges, fall 1928.....	76	
2. Adult turkeys released in western refuges, fall 1928 and early 1929.....	278	
3. Young turkeys raised at Game Farm, spring of 1929 and released in early fall 1929:		
Graham County.....	10	
Wilson County (Refuge).....	11	
Cleveland County (Refuge).....	11	
Lenoir County (Refuge).....	11	
Davidson County.....	14	
Lincoln County (Refuge).....	15	
Total.....		72
4. Adult turkeys released, fall of 1929 and spring of 1930:		
Alamance County (Refuge).....	4	
Cumberland County (Refuge).....	5	
Davidson County.....	10	

Edgecombe County (Refuge).....	2	
Guilford County (Refuge).....	4	
McDowell County.....	2	
Montgomery County (Refuge).....	4	
Randolph County.....	14	
Richmond County.....	2	
Stokes County (Refuge).....	5	
Swain County.....	9	
Gaston County (Refuge).....	4	
Lincoln County (Refuge).....	4	
Beaufort-Martin-Pitt.....	19	
Cumberland County.....	18	
Total.....	106	
		532
On hand at Game Farm.....	20	
Total distribution.....		552

*Refuges.* One of the greatest opportunities to increase game provided for by the State Game Laws is the establishment of State and County Game Refuges. Thus far, there has been established in compliance with the provisions of the law, seven refuges on State and Federal owned lands, and twenty-two county or auxiliary refuges on privately owned land.

It is hoped that this very important and necessary feature of any game conservation program can be rapidly continued until a refuge is secured for each county in the State. See subsequent table showing location, size, and species of game released in refuge. See foregoing table for cost of maintenance and protection of refuges.

*Public Hunting Grounds.* Each of the State Refuges, namely: Daniel Boone, Mount Mitchell, Wayah Bald, and Holly Shelter, has a large surrounding circumference of public shooting cover opened to any and all hunters, but subject, of course, to the provisions and restrictions of the North Carolina Game Law.

Particularly has the opening of the public hunting ground around the Holly Shelter Refuge proven of value and relief in providing facilities to nonresidents of the State, as well as residents of the State who inquired for public cover in which deer and turkey could be found. Although this area was not opened until the first week in January, 1930, one hundred and fourteen sportsmen, fifteen of whom were nonresidents, hunted in the Holly Shelter tract last year with success.

In establishing the county or secondary refuges, the Department has not been unmindful of the need and advisability of securing public shooting grounds adjacent to such refuges, yet it has been wholly unsuccessful in this endeavor. Private owners refuse to enter into any agreement with the Department to allow the general public to hunt upon their lands without compensation in the way of a rental or payment of their taxes. It is true, of course, that the overflow of game from these county refuges, makes better hunting for miles in every direction, nevertheless the matter of the establishment of unquestioned public hunting grounds is causing deep concern on the part of many sportsmen and game officials and must be met in the near future.



STATE AND AUXILIARY GAME REFUGES  
North Carolina—1927-1930

Designation	Estab- lished	Federal Land	State Land	Leased Land	Location	Species
Wayah Bald.....	1927	10,180	.....	.....	Macon County.....	Elk, Deer, Bear, Turkey, Pheasants, Quail, Opossum
Mt. Mitchell.....	1927	22,660	.....	.....	Yancey and McDowell Counties.....	Quail, Opossum, Turkey, Pheasants
Daniel Boone.....	1929	19,000	.....	.....	Avery and Caldwell Counties.....	Quail, Opossum, Turkey, Pheasants
Sutton Refuge.....	1928	.....	3,000	.....	Lenoir County.....	Turkey, Pheasants, Quail
Caledonia Farm.....	1929	.....	9,000	.....	Halifax County.....	Turkey, Pheasants, Quail
Holly Shelter.....	1929	.....	45,000	.....	Pender County.....	Turkey, Pheasants, Quail
Brush Creek.....	1927	.....	.....	350	Mitchell County.....	Deer, etc.
Sauratown Refuge.....	1928	.....	.....	45,000	Stokes County.....	Deer, Turkey, Pheasants, Quail, Opossum, Raccoon
Jeff Penn Refuge.....	1928	.....	.....	1,450	Rockingham County.....	Turkey, Pheasants, Quail
Haw Creek Refuge.....	1928	.....	.....	17,000	Alamance County.....	Turkey, Pheasants, Quail
Guilford County.....	1928	.....	.....	3,400	Guilford County.....	Turkey, Pheasants, Quail
Doane-Herring.....	1928	.....	.....	1,700	Wilson County.....	Turkey, Pheasants, Quail
Fort Bragg.....	1929	16,000	.....	.....	Cumberland County.....	Turkey, Pheasants, Quail
Camp Refuge.....	1929	.....	.....	9,000	Gates County.....	Deer, Turkey, Quail, Pheasants
Robeson County.....	1929	.....	.....	2,000	Robeson County.....	Turkey, Quail, Pheasants
Beaver Dam.....	1929	.....	.....	11,000	Montgomery and Stanly Counties.....	Turkey, Quail, Pheasants
Dan Ryne.....	1929	.....	.....	4,500	Lincoln County.....	Turkey, Quail, Pheasants
Cleveland County.....	1929	.....	.....	4,000	Cleveland County.....	Turkey, Quail, Pheasants
Moore County.....	1929	.....	.....	2,000	Moore County.....	Turkey, Quail, Pheasants
Polk County.....	1929	.....	.....	9,000	Polk County.....	Turkey, Quail, Pheasants
Roaring Gap.....	1929	.....	.....	10,800	Alleghany, Surry, Wilkes Co....	Turkey, Quail, Pheasants
Wilkes County.....	1929	.....	.....	12,000	Wilkes County.....	Turkey, Quail, Pheasants
Edgecombe County.....	1929	.....	.....	10,000	Edgecombe County.....	Turkey, Quail, Pheasants, Deer
Mecklenburg County.....	1929	.....	.....	1,500	Mecklenburg County.....	Turkey, Quail, Pheasants, Deer
Gregory Refuge.....	1929	.....	.....	2,100	Granville County.....	Turkey, Quail, Pheasants, Deer
Grady Township Refuge.....	1930	.....	.....	3,000	Pender, New Han. Counties.....	Turkey, Quail, Pheasants, Deer
Johnston County.....	1930	.....	.....	8,000	Johnston County.....	Turkey, Quail, Pheasants, Deer
Caswell County.....	1930	.....	.....	8,000	Caswell County.....	Turkey, Quail, Pheasants
Granville County.....	1930	.....	.....	8,000	Granville County.....	Turkey, Quail, Pheasants
Total Acreage.....	.....	67,780	57,000	173,800	.....	.....
					..298,580	

REFUGES UNDER PROCESS OF ESTABLISHMENT AT THE CLOSE OF THE BIENNIIUM

Designation	Estab-lished	Federal Land	State Land	Leased Land	Location	Species
Cabarrus County.....	.....	.....	.....	15,000	Cabarrus County.....	Turkey, Pheasants, Quail
Duplin County.....	.....	.....	.....	10,000	Duplin County.....	Turkey, Pheasants, Quail
Bertie County.....	.....	.....	.....	10,000	Bertie County.....	Turkey, Pheasants, Quail
Warren County.....	.....	.....	.....	8,000	Warren County.....	Turkey, Pheasants, Quail
Bladen County.....	.....	.....	.....	5,000	Bladen County.....	Turkey, Pheasants, Quail
Total.....	.....	.....	.....	48,000	.....	.....

*Licenses.* The method of handling the sale of licenses this past season proved satisfactory and financially sound. Only the county warden receives the licenses for sale in his county. The warden is under bond and

LICENSE COLLECTIONS—SEASON 1929-1930

County	Non-resident License	State License	County License	Total Receipts	Fur Dealers License Receipts
Alamance.....	28	642	1,716	\$4,101.25	\$ 85.00
Alexander.....	0	115	387	746.75	10.00
Alleghany.....	1	41	260	420.50	0
Anson.....	0	73	994	1,234.25	0
Ashe.....	0	7	975	1,083.00	40.00
Avery.....	0	54	324	520.00	50.00
Beaufort.....	27	410	1,891	3,891.00	165.00
Hyde.....	4	27	352	565.25	20.00
Bertie.....	13	266	1,507	2,564.25	115.00
Bladen.....	12	165	944	1,692.50	135.00
Brunswick.....	2	74	751	1,055.50	10.00
Buncombe.....	3	944	2,640	5,602.00	180.00
Burke.....	0	139	813	1,247.75	20.00
Cabarrus.....	0	423	911	2,472.25	0
Caldwell.....	1	154	1,256	1,780.50	40.00
Camden.....	13	83	395	984.00	10.00
Carteret.....	167	170	923	3,971.75	0
Caswell.....	13	82	624	1,084.50	0
Catawba.....	2	441	1,294	2,725.00	20.00
Chatham.....	105	159	809	2,888.75	10.00
Chowan.....	2	96	413	774.75	85.00
Cherokee.....	1	120	580	993.75	10.00
Clay.....	0	10	229	272.00	0
Cleveland.....	0	432	1,530	2,863.75	0
Columbus.....	43	188	1,318	2,605.00	575.00
Craven.....	86	521	1,630	4,713.75	305.00
Cumberland.....	12	419	1,074	2,609.50	150.00
Currituck.....	69	25	366	1,616.00	40.00
Dare (No Sales).....					
Davidson.....	40	434	1,082	2,995.00	0
Davie.....	3	137	986	1,468.00	0
Duplin.....	6	340	1,368	2,543.50	90.00
Durham.....	0	1,182	893	4,289.00	0
Edgecombe.....	9	722	1,603	4,101.38	90.00
Forsythe.....	3	1,986	1,652	7,849.50	85.00
Franklin.....	0	135	922	1,381.75	0
Gaston.....	3	670	1,326	3,388.25	0
Gates.....	26	69	622	1,345.75	70.00
Graham.....	6	38	430	674.25	0
Granville.....	16	91	561	1,091.50	0
Greene.....	0	128	752	1,187.50	0
Guilford.....	54	1,799	1,442	7,754.25	155.00
Halifax.....	21	454	1,909	3,749.00	185.00
Harnett.....	30	346	889	2,448.00	30.00
Haywood.....	11	168	902	1,651.25	0
Henderson.....	2	177	893	1,529.75	10.00
Hertford.....	12	135	930	1,597.00	70.00
Hoke.....	3	83	393	700.25	10.00
Iredell.....	1	372	1,787	2,968.75	10.00
Jackson.....	2	44	535	722.50	0



## LICENSE COLLECTIONS—SEASON 1929-1930—Continued

County	Fur resident License	State License	County License	Total Receipts	Fur Dealers License Receipts
Johnston.....	0	286	2,601	\$3,532.75	\$ 20.00
Jones.....	4	108	586	1,054.50	50.00
Lee.....	9	172	441	1,131.50	0
Lenoir.....	7	585	961	2,935.75	155.00
Lincoln.....	0	158	479	971.25	0
Macon.....	0	46	716	946.25	0
Madison.....	0	40	676	842.75	0
Martin.....	0	246	1,039	1,922.75	100.00
McDowell.....	0	126	599	989.00	0
Mecklenburg.....	2	1,004	1,826	4,787.22	0
Mitchell.....	0	62	478	704.25	10.00
Montgomery.....	0	127	431	821.25	30.00
Moore.....	71	257	486	2,371.75	20.00
Nash.....	0	529	1,684	3,384.50	10.00
New Hanover.....	4	697	442	2,638.25	95.00
Northampton.....	7	60	1,542	1,949.00	210.00
Onslow.....	47	126	1,095	2,310.50	80.00
Orange.....	0	247	831	1,617.75	0
Pamlico.....	20	87	523	1,148.00	40.00
Pasquotank.....	15	269	448	1,541.00	95.00
Pender.....	16	92	969	1,510.00	40.00
Perquimans.....	0	20	273	368.25	0
Person.....	14	99	942	1,483.75	0
Pitt.....	4	678	1,870	4,200.75	255.00
Polk.....	1	31	346	468.00	0
Randolph.....	88	338	1,006	3,405.25	115.00
Richmond.....	5	235	773	1,592.50	10.00
Robeson.....	22	397	1,302	2,910.25	90.00
Rockingham.....	3	366	1,888	3,058.75	0
Rowan.....	6	440	973	2,420.00	0
Rutherford.....	0	172	1,296	1,848.00	0
Sampson.....	0	122	1,228	1,649.50	210.00
Scotland.....	10	57	306	472.00	60.00
Stanly.....	0	252	675	1,447.00	0
Stokes.....	1	82	1,067	1,350.75	0
Surry.....	5	224	1,208	1,963.00	0
Swain.....	5	38	386	631.25	20.00
Transylvania.....	2	24	426	546.75	10.00
Tyrrell.....	0	0	129	192.00	0
Union.....	1	112	1,414	1,820.25	0
Vance.....	5	306	756	1,777.75	0
Wake.....	37	1,105	2,259	6,244.25	273.00
Warren.....	6	186	1,606	2,317.25	10.00
Washington.....	1	129	419	950.75	60.00
Watauga.....	0	42	520	702.50	50.00
Wayne.....	2	441	1,695	3,156.25	275.00
Wilkes.....	0	69	1,098	1,347.75	150.00
Wilson.....	3	618	1,781	3,743.00	0
Yadkin.....	0	109	569	904.25	0
Yancey.....	0	32	479	611.00	0
Grand Total.....	1,275	27,908	96,326	\$205,208.10	\$5,423.00

Total Game Receipts.....	\$203,433.60
Total Fur Receipts.....	5,423.00
Total allocation from Combination Hunting and Fishing Licenses to Fish License Fund..	1,774.50
Total of unsettled accounts due by wardens.....	566.40

held responsible for the licenses charged against him. In turn, he selects his license selling agencies over the county to such extent as to make the sale of licenses convenient to the people in his county.

The License Bureau of the Game Division, under the supervision of Assistant Director, J. S. Hargett, deserves special mention for the successful collection of license receipts. As shown by the accompanying financial sheet, there is less than \$600.00 due the Department by the warden service. Further, more than \$2,000 has been collected this year from unsettled accounts carried forward from the seasons 1927-28, and 1928-1929.

The law as amended by the 1929 Legislature provided for the issuance of several new combination licenses. Among them, a combination nonresident hunting and fishing license; a nonresident trapper's license; and a nonresident hunting and trapping license. Only six nonresident hunting and fishing licenses were sold, with no sale in either of the other two classifications. Therefore, the issuance of the licenses of the above classifications will be discontinued.

*Vermin.* Eradication of vermin and other predatory wild life has had the active attention of the Department and warden service at all times. There can be no material multiplication of game life in any section infested with natural enemies. Special effort is made at all times to rid the refuges of predatory life. Planting artificial feeds for game animals and birds also attracts predatory life, and the refuge wardens resort to all known means of keeping down the vermin.

A bounty is paid on crows, hawks and wild cats killed any where in the State during the open season. It is removed during the closed season for fear it may prove to be an incentive and afford an excuse for unscrupulous persons to kill game under the guise of hunting for outlawed life.

*Education.* It has been through the channel of education that perhaps the greatest accomplishment for the promotion and advancement of game and other wild life has been made since the State-wide law was passed.

The press, the radio, talks by Department officials, and the warden personnel, special articles and publications, motion pictures of game, the Department's publication, "Conservation and Industry", all have been employed to bring to the people of the State the great economic and recreational value of this important natural resource.

We point with pride to the splendid coöperation of each division of the Department with the other in carrying on the educational campaign for the promotion and exploitation of the State's resources. Support and coöperation of sportsmen's organizations have contributed to the undertaking beyond estimate.

Your Department acknowledges with profound gratitude the splendid service and active coöperation of each of the above agencies, and extends to the other State Departments its appreciation for the support given; and to the U. S. Game Protectors, the U. S. Biological Survey, the U. S. Forest Service, the U. S. Bureau of Fisheries, the Railroads, and Express Companies, we extend our sincerest thanks for the courteous and substantial service rendered.

The motion picture of five reels of game has been shown throughout the State and has aroused an interest among the school children and all the people seeing it. Effects of the picture have been reflected in many ways in the promotion of the game, fish and forestry program.

The recently formed Izaak Walton Chapters, more than fifty in number, throughout the State have and will continue to materially contribute in bringing about a condition that will vastly improve hunting and fishing conditions for ourselves and assure to unborn generations that they too may enjoy the value and pleasure of these Divine gifts.

*Federal Migratory Game Refuge.* The Norbeck-Andresen bill, adopted by Congress during the past biennium, sets up a Federal policy for the development of a system of migratory game refuges which has as its object the establishment of at least one such reserve in every State in the Nation.

This legislation calls for Federal appropriations amounting to several million dollars over a period of eight years for the purchase of areas on which wild life will be fully protected. The first appropriation to carry out this act was small, but will be progressively larger for the next few years when acquisition will be undertaken on a large scale.

From the inception of the idea of the creation of such a Federal refuge system, the Department has supported the movement heartily, urging while the legislation was pending, the support of the North Carolina delegation in Congress.

Since the legislation was enacted, the Department has urged that North Carolina's importance as a wintering ground for the migratory wild fowl entitles this State to one of the first refuges established under its authority. Appraisers from the purchase commission have already made a preliminary survey in Eastern North Carolina and have looked over several areas that have been proposed as refuges. State officials believe that the creation of such a refuge in this section of the State will be an important step in the perpetuation of migratory wild life.

### *Miscellaneous*

*Establishment of Fur-Bearing Animal Farm.* The matter of taking definite action to make more abundant the fur-bearing animals of the State and thereby promote the fur-bearing industry is receiving careful consideration. Investigations are now being made and a decision in the matter is scheduled shortly.

*Hanes-Lassiter Game and Migratory Wild Fowl Refuge.* On February 11th, 1930, Mr. and Mrs. Robert Lassiter, of Charlotte, tendered through Governor O. Max Gardner, Chairman ex-officio of the Board of Conservation and Development, their place, "Pilentary", situated on "the Banks" in Carteret County, under certain conditions, to the Department for permanent use as a State Game and Migratory Wild Fowl Refuge.

The area has been named the "Hanes-Lassiter State Game Refuge", and has been placed under administration by the Department. It begins about four miles southwest of Ocracoke Inlet and extends to the southwest along the banks about eight miles including frontage on the Atlantic Ocean and Pamlico Sound for this distance.



The chief stipulation made by the donors is that its administration pass through a probationary period of five years, at the close of which time, "if in our mutual opinion it is a success as a Game Refuge it is our desire to present it in fee to the State Game Department to be administered by them for all time as a Game Reserve".

Soon after the offer, the Director and the State Game Warden made an inspection of the property and found it suitable for use as a Game Refuge. The owners have given wild life on the property close protection over a period of years, and with their suggestions, it is estimated that the refuge can be administered at a cost of approximately \$5,000 annually.

*State-Wide Game Survey.* A preliminary study of game conditions is being conducted to determine the status of the wild life of the State. This survey is being made under the direction of M. W. Haynes, of Tarboro, N. C. A fuller report on this survey will be made after its completion. The present preliminary survey will be made in about twenty-seven counties, cross-sectioning the State. If this endeavor proves to be advantageous and furnishes the information desired and expected, consideration should then be given the matter of making the survey in every county in the State. The preliminary survey will probably cost around \$3,000. Based upon these figures, a survey of the entire State would probably cost \$10,000.

*Employment of a Lecturer on Game and Wild Life.* The Department has had under consideration for some time the matter of the employment of a lecturer on game and other wild life. Many of the states have such a lecturer to bring to the attention of the general public and particularly the school children of the State the economic and recreational value of our game and other wild life. Such a lecturer would also organize conservation clubs in the schools and would encourage similar organizations already in existence, such as Boy Scouts, etc., to study the game laws and the benefits to be derived from this resource.

*Shortening the Season On Deer and Turkey.* There is considerable sentiment in the State for a shorter season on deer. Under Section 15, the Board has the power to shorten the season within the dates named in the law on any game animal or game bird.

*Enlarging the Bag Limit on Quail for Non-Residents.* The Department is in receipt of requests and suggestions from non-residents that the bag limit, as well as the number of quail a non-resident is permitted to take out of the State in one week is too low and not sufficient to justify non-residents shooting in North Carolina.

*Open Seasons on Squirrels.* There is still considerable dissatisfaction with respect to the open season on squirrels. Both the eastern and western sections of the State are complaining that the time fixed to hunt squirrels does not cover the period when the gunning season is the best.

*Coons and Opossums.* Considerable complaint has been made to the Department that the open season to hunt raccoons and opossums with dogs only is likewise improper. This season should probably open October 1st and

close December 1st. At present it opens in the eastern part of the State November 15th and closes February 15th. In the western part of the State it opens November 1st and closes February 15th.

*Same Distribution.* The plan of distribution for game reared at the game farm now followed is to stock all State and Auxiliary Refuges and then distribute the remainder throughout the State, each county receiving the same amount, regardless of other considerations.

### *Changes in Seasons*

From July 1st, 1928, to June 30th, 1930, the following changes in seasons have been made in accordance with the provisions of Section 15, of the Game Law:

*Deer season* changed in following counties: *Bladen County*, present open season from October 1st to November 30th. *McDowell County*, season closed for two years, ending September 30th, 1931. *Yancey County*, season closed for two years, ending December 15th, 1931.

*Turkey season* changed in following county: *McDowell County*, season closed for two years, ending September 30th, 1931.

*Rabbit season*, changed in following counties: *Surry County*, present open season from October 15th to February 15th. *Stokes County*, present season open from October 15th to February 15th.

*Bear season* changed in following county: *McDowell County* from October 15th to January 15th.

Special attention has been given the song birds, insectivorous birds, and birds of plumage, by Department officials. Particularly through the schools is the Department making an effort to bring to the children and the people generally the importance and value of this class of wild life. Wardens have been requested to protect these species to the fullest extent provided under the law.

### DIVISION OF GAME RECEIPTS AND DISBURSEMENTS BIENNIAL PERIOD ENDING JUNE 30, 1930

	1928-29	1929-30
Administrative Salaries.....	\$.....	\$ 18,645.81
Salaries and Expenses, Warden.....		75,728.95
Supplies and Materials.....	7,051.45	689.27
License Buttons.....		6,485.30
Postage, Tel. Exp. and Freight.....	2,877.09	1,883.79
Administrative Travel Expense.....		6,331.61
Printing and Binding.....	8,614.10	3,909.42
Motor Vehicle Operation.....	121.27	553.44
Repairs.....	35.05	10.75
General Expense.....	424.73	1,607.94
Equipment.....	4,211.37	435.53
Farms and Refuges.....		51,868.97
Personal Services.....	115,345.22	

DIVISION OF GAME RECEIPTS AND DISBURSEMENTS BIENNIAL PERIOD ENDING  
JUNE 30, 1930—Continued

	1928-29	1929-30
Travel Expense.....	\$ 23,146.35	.....
Refuges.....	23,760.39	.....
Fairs.....	705.00	.....
Bounties.....	2,077.25	.....
Motion Picture.....	3,015.94	.....
Stock.....	13,146.81	.....
Bonding.....	1,227.38	.....
Land.....	15,552.85	.....
Total Expenditures.....	\$221,312.25	\$168,150.78
Less Receipts.....	281,479.36	266,145.90
Appropriation.....	\$ 60,167.11	\$+97,995.12
Deduct Forestry Advance.....	.....	42,000.00
Balance Carried forward, 1930-31.....	.....	\$ 55,995.12



## DIVISION OF INLAND FISHERIES

J. S. HARGETT, *Assistant Director*

CHRISTINE POLLOCK, *Stenographer*

The Assistant Director in charge of the Division of Inland Fisheries not only supervises the Inland Fisheries program, among his duties in this line being the enforcement of laws and regulations for the conservation of fish in all waters of the State, except those classified as "Commercial"; operation of State Fish Hatcheries, and associated functions; but he also handles the collection of game and fish licenses.

Under authority delegated by the General Assembly, the Board of Conservation and Development passes rules and regulations governing the seasons, bag limits, sizes, and seasons for fishing in "Inland Waters". To simplify this procedure, the Board has classified all waters of North Carolina as either "Inland" or "Commercial". This action was necessary for effective administration of the two classes of regulations.

The State Anglers' Act passed by the General Assembly establishes three classes of licenses: \$2.10 being the fee for all residents of the State who fish outside of their resident county; and \$3.10 for residents of other States. This act further empowers the various Boards of County Commissioners by resolution entered upon their minutes to require a resident County Fishing License of \$1.10, or a daily permit of 50c.

*Fishing License Collections.* Because of the small amount of revenue realized from the sale of licenses, the Division of Inland Fisheries has been forced to curtail substantially its expenditures to remain within its budget. With the enactment of the State Anglers' Act, no further appropriation for the work of this Division was made, and it has been forced to depend entirely upon the collection of license fees.

Under the license law, collections for the fiscal year ending June 30, 1929, amounted to \$35,007.10; and for the year ending June 30, 1930, \$45,527.35. The amount of expenditures for the first year of the biennium were \$49,710.58, and for the second year, \$51,470.22.

Without the additional funds provided through the adoption of the optional privilege of county licenses, the work of the Division would be seriously handicapped, and probably resulting curtailments would require the suspension of operation of some of the hatcheries. Those counties in which the resolution requiring a county license has been adopted include the following:

Alleghany	Graham	Swain
Alexander	Henderson	Watauga
Ashe	Jackson	Yancey
Avery	McDowell	Richmond
Buncombe	Macon	Wilkes
Caldwell	Mitchell	Transylvania
Cherokee	Moore	Madison
Clay	Polk	Haywood

*Law Enforcement.* For the first year of the biennium a complete report of the total number of prosecutions and convictions is not available, but during the last fiscal year, 678 prosecutions were brought by wardens for violations for the fishing laws. Almost 95 per cent of the prosecutions resulting in convictions, with 641 convictions out of the total number brought into court.

Fines and court costs levied against the defendants in the 641 cases in which convictions were obtained amounted to \$5,887.43. Aside from the costs of court, the rest of the amount assessed against the fish law violators reverts to the School Fund in the various counties in which the prosecutions occurred.

As a whole, the fish laws demand the greatest respect today that they have ever had from the public. For this condition two causes may be assigned—first, a growing realization that fisheries regulations are not intended to curb individual enjoyment of fishing as one of the greatest of all sports, but rather they represent the State's efforts to continue and increase the attractiveness of fishing in order that it may be as fully or more fully enjoyed in the future than at present; and the activity of wardens in curbing violations by the prosecution of those who break the laws.

Although the adoption of the proper regulations is a problem of considerable magnitude, requiring continuous study of conditions and the operation of regulations, it is believed that the laws in effect at this time have reached a more satisfactory stage than at any previous time, considering the demands for a successful conservation policy and the practical effect of their operation. Undoubtedly there are some features that require a change, and these are constantly being made as a result of experience.

One of the outstanding achievements during the biennium for the conservation of fish life has been the adoption of a closed season for all types of fish during the spawning period. It has been found that a closed season on only certain types of game fish was almost unenforcible because of the impossibility of knowing the fish that would be induced to take the bait that is offered. In addition to this change, the Inland Fisheries Regulations have been codified and simplified during the biennium.

Taken altogether the administration of the State Anglers' Act and the Rules and Regulations have met the expectations of the Division and the friends of conservation of fish life as indicated by the kind letters of commendation from different sections of the State.

### *Fish Propagation*

This biennium was marked by a substantial increase in output of the various State fish hatcheries and a more efficient operation of these institutions.

Although artificial propagation at the hatcheries cannot compete with nature in maintaining a satisfactory supply of game fish for our waters nevertheless their operation is a necessary part of a complete and effective policy of fish conservation.

Some of these fishing waters have become so thoroughly depleted of fish life that it is necessary to return brood stock in order to hope for a reasonable enjoyment of the sport in the future. Such a policy is made necessary



by some factors which interfere with the natural replacement of fish life, included among which are increase in pollution making some of the waters unfit for fish habitation and reducing the suitability of other waters for this form of wild life. Other reasons for re-stocking by propagation are, increase in the fishing population, better transportation which makes the entire State the fishing ground for the enthusiastic angler, and constantly improved tackle. Heavy fishing of some waters causes a continuous drain on the fish life, making it necessary to replace some of the stock taken out. Added to these are illegal methods of taking fish in wholesale quantities which, however, owing to the vigilance of the wardens, is being reduced. Heavy penalties on violators by the courts are also decreasing destructive methods of taking fish such as by dynamiting and seining.

The output from the State hatcheries for each year of the biennium has exceeded that of the previous year. For the fiscal year ending June 30, 1929, the total output of game fish from the hatcheries was 3,353,121 fingerlings and fry. The output of the hatcheries for the year ending June 30, 1930, was 4,185,000. These figures do not include 10,000,000 striped bass (rock) distributed by the Weldon hatchery, operated coöperatively by the U. S. Bureau of Fisheries and the North Carolina Department of Conservation and Development in 1929. Owing to low water in the Roanoke River, the Weldon hatchery was not operated in 1930, but it is the intention of the coöperating agencies to continue the hatchery next year.

Attention is here called to the adoption of a policy by the Department of releasing only fingerlings from the stock produced at the hatcheries to the extent of its ability to meet this expense. This determination has been carried out fully in so far as it applies to trout from hatcheries of the western part of the State where facilities have been found for such a program. Rearing of bass is a more difficult undertaking, but substantial progress has been made along this line and it is believed that within a season or two that provisions will be found to bring every fish produced at all the hatcheries to a fingerling stage before distribution.

*Nursery Ponds.* In previous paragraphs mention has been made of the efforts to make the fish stocking program more effective by rearing the baby fry past the critical stage of infancy or to the fingerling stage. This program was launched in North Carolina about three years ago along with a national movement to this effect.

Although faced constantly with the demand for retrenchment and a curtailment of funds, every effort has been put forth by the Division to increase the efficiency of its stocking efforts by planting only fish large enough to take care of themselves when thrown upon their own resources and taken from the protected environment of the hatchery.

Realizing the limit of its facilities, the Division made an appeal to the sportsmen of the State to aid in this feature of the Inland Fisheries program by the construction of nursery pounds or rearing pools. These appeals were met by an immediate and thorough response on the part of individuals and organizations of sportsmen. Nursery ponds began to spring up over the State with such swiftness that a comprehensive chain is now in operation.



Just how thoroughly this movement has spread is shown by a survey made by the Division early in 1930. A record of 210 nursery ponds was compiled. In these ponds, a total of 2,606,800 fish were reared, while their combined capacity was estimated to be 6,000,000 most of this capacity, however being for trout, leaving a need for more bass pools to take care of the entire output of this species of fish from the hatcheries.

The report from the survey of rearing ponds showed a total expenditure of some \$205,682.00 in their construction. These funds denote in their entirety investments of sportsmen and groups of sportsmen in better fishing facilities. The expenditure of this money demonstrates the expense to which sportsmen are willing to go in order to conserve one of the greatest of all natural resources.

While the sportsmen of the State were making their contribution to better fishing, the Department of Conservation and Development was extending every effort to carry fish for which rearing arrangements could not be found, especially bass, as long as possible at the hatcheries. As a result of the combination of efforts, as has been previously explained, with the exception of some of the bass, no fish have been planted in the last year or so that have not been carried at least beyond the stage of infancy. The Department's share in this work has increased the cost of propagation several thousand dollars in the form of larger feed bills and the enlargement of facilities for holding the fish at the hatcheries.

*Hatcheries.* The State's fish cultural system consists of five major hatcheries, one sub-hatchery, and two hatcheries operated coöperatively with the U. S. Bureau of Fisheries. The main hatcheries and their locations are as follows: Morrison Hatchery, Waynesville; "Pete" Murphy Hatchery, Marion; Roaring Gap Hatchery, Roaring Gap; Boone Hatchery, Boone; and Frank Stedman Hatchery, Fayetteville. The sub-hatchery is located on Lake James, Burke County, and is operated under the direction of the superintendent of the "Pete" Murphy Hatchery.

Three of the hatcheries are devoted entirely to the culture of trout; one produces both trout and bass; and two, including the sub-hatchery at Lake James rear only bass and other sunfish. The coöperative hatchery at Weldon produces only striped bass (rock), and the Federal hatchery at Edenton toward the operation of which the State makes a contribution, rears only bass and other sunfish.

While the trouts can be artificially manipulated by the stripping and fertilization of eggs, the sunfishes can only be propagated through the natural course; and, therefore, the output is limited to the natural reproduction in brood ponds. For this reason, the output of sunfishes fluctuates widely in number, being at the mercy of the elements and the cannibalism that is pronounced with these species, especially the basses. A sudden cool freshet, or pronounced drought have often a serious effect on the supply of these types of fish reared at the hatcheries.

One of the great needs of the State's fish propagation program is the enlargement of facilities for rearing bass and other sunfish. A complete hatchery system would call for one or two new hatcheries in Eastern North Carolina and one hatchery in the Piedmont or central part of the State. It is hoped that facilities for the construction of these additions may be found within the next few years.

Fish cultural work at the hatcheries has been on the whole satisfactory. The absence of disease from these stations is evidence of this fact. Cleanliness and years of experience on the part of the superintendents have contributed largely in bringing this about.

*Distribution of Fish.* In the following tables are given the outputs of the various hatcheries during the two years of the biennium. As has previously been explained, the output of the Lake James Hatchery is made under the direction of the superintendent of the "Pete" Murphy Hatchery, and therefore is not given separately here. Attention has also been called to the suspension of operation of the Weldon Hatchery in 1930 because of the extremely low level of the Roanoke River, making it impossible to obtain eggs. Distribution from that hatchery as well as from the Edenton Hatchery was made coöperatively by the Department and the U. S. Bureau of Fisheries.

The outputs of the various hatcheries for the two years of the biennium were:

	1929	1930	Total
<b>MORRISON HATCHERY, Waynesville, N. C.</b>			
Rainbow Trout (Fingerlings).....	138,000	38,480	176,480
Rainbow Trout (Adults).....	1,700	.....	1,700
Brook Trout (Fingerlings).....	972,000	1,161,000	2,133,100
Brook Trout (Yearlings).....	8,915	.....	8,915
Brook Trout (Adults).....	3,606	420	4,026
Totals.....	1,124,221	1,200,000	2,324,221
<b>ROARING GAP HATCHERY, Roaring Gap, N. C.</b>			
Brook Trout (Fingerlings).....	1,000,000	960,000	1,960,000
Loch leven.....	.....	40,000	40,000
Totals.....	1,000,000	1,000,000	2,000,000
<b>"PETE" MURPHY HATCHERY, Marion, N. C.</b>			
Rainbow Trout (Fingerlings).....	100,400	550,000	650,400
Black Bass (Fry).....	81,000	50,000	131,000
Black Bass (Fingerlings).....	105,000	.....	105,000
Bream (Fry).....	20,000	.....	20,000
Totals.....	306,400	600,000	906,400
<b>FRANK STEDMAN HATCHERY, Fayetteville, N. C.</b>			
Black Bass (Fry).....	146,500	150,000	296,500
Bream (Fry).....	10,000	25,000	35,000
Crappie (Fry).....	10,000	.....	10,000
Totals.....	146,500	175,000	341,500
<b>BOONE HATCHERY, Boone, N. C.</b>			
Brook Trout (Fingerlings).....	756,000	960,000	1,716,000

	1929	1930	Total
WELDON HATCHERY, Weldon, N. C.			
Rock (Striped bass) .....	10,000,000	.....	10,000,000
EDENTON HATCHERY, Edenton, N. C.			
Bass (Fry) .....	.....	250,000	250,000
GRAND TOTALS.....	13,353,121	4,185,000	17,538,121

Herewith are given the areas of the State-owned property at the hatcheries. An inventory shows a total valuation of these institutions, including land, buildings, and improvements to be approximately \$130,000.00. Following is the area of land owned by the State at each hatchery:

Frank Stedman Hatchery .....	{ 14 acres
Lake Rim—49 acres—Cumberland County.....	{ 63 acres
Balsam Hatchery—Haywood County.....	12 acres
Marion Hatchery—McDowell County.....	17 acres
Roaring Gap Hatchery—Alleghany County.....	12 acres
Boone Hatchery—Watauga County.....	6 acres

### *Stream Pollution*

Industrial and domestic pollution are becoming problems of increasing intensity to the Inland Fisheries program of the State. These wastes must be reduced or at least their destructive qualities must be eliminated to as large a degree as its practicable if fish life is to continue to exist in some of our streams. In some cases practical methods of treatments that meet these demands have been found and these should be installed as expeditiously as possible in order to save useless dissipation of fish life. Other cases exist where economical treatments have not yet been completely worked out, but where research is being applied for the solution of the attendant problems of pollution.

The fact remains, however, that every effort should be directed toward maintaining the purity of our waters if their facilities for producing fish life are to be retained. The Department's position in this respect is made difficult because it must strive to hold to a level headed view that would not make unreasonable demands of industries upon which a large per cent of the population of the State is dependent for a livelihood. On the other hand, it is not equipped with sufficient legal authority that would permit the requirement of immediate abatement of every pollution nuisance.

Legislation that will give the Department broader authority in these problems is needed. With such authority it would be possible to go forward more rapidly in the solution of specific cases of pollution. However, the problems will continue to grow with further industrial development of the State and the utilization of its resources in manufacturing processes. We must not adopt a policy so drastic that will set back the State's progress, but on the other hand we must insist that every reasonable precaution is taken to remove the damaging qualities of waste that make waters uninhabitable for fish life. Where methods of treatment that are practicable



have been found, industry should be required to put them in operation and when reasonable demands under the law are not complied with, legal action should speedily be put into force to require respect for the law.

Intricate problems are faced in most instances of pollution, requiring painstaking efforts and scientific study for their solution. In this work the Division of Inland Fisheries has coöperated fully with Division of Water Resources and the State Board of Health as represented in the State Stream Sanitation and Conservation Committee. Investigations are now underway along several streams and progress is being made. All of these agencies are bringing their full resources to bear under existing legal authority and available means to correct existing pollution and to eliminate future sources. They are insisting that established industries work out remedies as quickly as possible.

### *Fish Ponds*

Among the educational projects that have been pushed during the bien-nium by the Division is the construction of private fish ponds on the farm or by landowners wherever a suitable location is found. This has repeatedly been advocated in the public press, by radio, and in the regular Departmental publications.

Attention has been called to the additional sport that would be provided by the construction of these ponds, and also to the important source of additional food supply that would be furnished as a result. It has been estimated that residents of North Carolina could save millions of dollars annually on their food bills with the development of this potential source of food.

In addition, the fact that the construction of ponds would frequently eliminate eye-sores and views that detract from the value of property has been emphasized. Thus, more fish ponds will help to develop a more beautiful country-side and more valuable holdings for the landowner.

That this movement has been attended with a fair degree of success is attested by word received of new ponds constantly being developed throughout the State. Scores of new ponds have been built in the last several years in North Carolina, and many others are now considering such a project.

### *Recommendations*

(1) The Division recommends that the issuance fees for angler's licenses be increased from 10c to 25c. This change would establish the following fees for licenses: Non-resident, \$3.25; State, \$2.25; and County, \$1.25. Such action is suggested for the purpose of giving the wardens greater inducement to push the sale of licenses which is essential if the Inland Fisheries program is to be carried out effectively in the future.

Operating expenses of the hatcheries with necessary improvements cannot be held within the amount now collected from the sale of licenses after payment of any part of the services of the wardens for patrolling Inland waters and administering the laws.

(2) Further recommendation is made that the laws prohibiting the pollution of streams be amended so as to be of practical operation in dealing with these problems. Various exceptions make the present statutes virtually inoperative in many cases.

DIVISION OF INLAND FISHERIES RECEIPTS AND DISBURSEMENTS  
Biennial Period Ending June 30, 1930

	1928-29	1929-30
433 Salary, Assistant Director.....		\$ 4,500.00
434 Salaries and Wages.....	\$ 23,104.37	19,698.28
435 Supplies and Materials.....	10,832.09	120.41
436 Postage, Tel. Exp. and Freight.....	1,159.29	395.86
437 Travel Expense.....	1,322.00	672.76
438 Printing and Binding.....	1,403.77	837.59
439 General Expense.....	44.68	75.40
440 Equipment.....	2,921.21	106.00
Auto Upkeep.....	1,326.24	
Lights and Water.....	70.68	
Repairs.....	1,119.11	
Additions and Betterments.....	5,327.14	
Fair.....	80.00	
Morrison Hatchery:		
441 Salaries and Wages.....		4,310.75
442 Supplies and Materials.....		2,484.76
443 Postage, Tel., Exp., and Freight.....		112.33
444 Travel Expense.....		57.31
445 Motor Vehicle Operation.....		218.16
446 Lights.....		49.73
447 Repairs.....		129.59
448 Equipment.....		71.55
Pete Murphy Hatchery:		
449 Salaries and Wages.....		2,552.60
450 Supplies and Materials.....		1,233.61
451 Postage, Tel., Exp., and Freight.....		26.70
452 Travel Expense.....		37.40
453 Motor Vehicle Operation.....		198.87
454 Repairs.....		88.87
455 Equipment.....		84.11
Frank Stedman Hatchery:		
456 Salaries and Wages.....		2,948.25
457 Supplies and Materials.....		612.09
458 Postage, Tel., Exp., and Freight.....		93.55
459 Travel Expense.....		144.62
460 Motor Vehicle Operation.....		262.29
461 Repairs.....		214.68
462 Equipment.....		202.00
Roaring Gap Hatchery:		
463 Salaries and Wages.....		2,647.45
464 Supplies and Materials.....		1,594.43
465 Postage, Tel., Exp., and Freight.....		84.21
466 Travel Expense.....		126.64
467 Motor Vehicle Operation.....		337.28
468 Repairs.....		51.85

## DIVISION OF INLAND FISHERIES RECEIPTS AND DISBURSEMENTS—Continued

	1928-29	1929-30
Boone Hatchery:		
470 Salaries and Wages.....	\$	2,040.00
471 Supplies and Materials.....		1,351.34
472 Postage, Tel., Exp., and Freight.....		22.80
473 Travel Expense.....		9.90
474 Motor Vehicle Operation.....		162.19
475 Repairs.....		9.49
476 Equipment.....		15.00
Lake James Hatchery:		
477 Salaries and Wages.....		210.00
478 Supplies and Materials.....		30.49
479 Repairs.....		185.00
480 Coöperation with U. S. Bureau of Fisheries in operation of hatchery at Weldon.....	\$ 1,000.00	52.03
Total Expenditures.....	\$ 49,710.58	\$ 51,470.22
Less Receipts.....	28,280.07	52,596.35
Appropriation.....	\$ 21,430.51	\$+1,126.13
Balance carried forward 1930-31.....		1,126.13



## DIVISION OF MINERAL RESOURCES

H. J. BRYSON, *State Geologist*

The following report outlines briefly the activities of the Division of Mineral Resources during the biennium from June 30, 1928, to July 1, 1930. During this period, the duties of the Division have been carried on fairly successfully in spite of the small appropriation given by the last legislature. The funds provide only for one full time geologist and a part-time stenographer. No funds were provided for field work, topographic and geologic mapping, underground water investigation or other similar work that would aid or promote the development of the mineral industry. Consequently, no detailed geologic work of any kind has been done during this biennium nor have any problems of scientific interest been worked out. The work has been limited entirely to those things of economic interest.

A great number of inquiries regarding the mineral deposits have been answered, and 600 mineral and rock specimens have been received and reported on. The work of collecting and indexing statistics of the State's mineral production has been carried on in coöperation with the Bureau of Census, according to the agreement of 1925.

Several feature articles, well illustrated, have been prepared by the State Geologist and published in the "Manufacturers Record," "Rock Products", "Engineering and Mining Journal", "Ceramic Age", "Mining Congress Journal", and similar trade magazines. These articles have had their effect in interesting large companies in the minerals of North Carolina. In addition to these articles, several others have been prepared for "Conservation and Industry" and the newspapers to acquaint the people with the mineral developments of the State.

Several radio talks have also been prepared and delivered over radio station WPTF. In addition to these, other talks were prepared and delivered by the State Geologist to several civic clubs of the State as well as to several national meetings outside of the State.

During the past two years, trips were made through the mineral producing centers of the State for the purpose of getting accurate information concerning the mineral industry as well as to investigate undeveloped mineral properties.

There is given briefly below the activities in the various mineral industries in the State.

### *Metallic Minerals*

*Gold and Silver.* Considerable interest has been shown in the gold deposits of the State. Three gold recovery plants have been built, one in Montgomery County and two in Franklin County. The success or failure of these plants will determine, to some extent, the immediate future developments in gold properties.

Several large companies, including the United States Smelting, Mining and Refining Company, American Smelting and Refining Company, American Zinc Company, The National Lead Company and several others of na-

tional importance have had engineers and geologists in the State investigating metal deposits. Some of the companies have optioned properties in various sections of the State.

The following gold bearing properties are reported to have been optioned by large companies: The Portis and Whitehouse properties in Franklin County; the Peters, Silver Valley and Cid properties in Davidson County; the Howie mine in Union County; some of the Gold Hill properties in Rowan County; and the Black Ankle mine in Montgomery County. Other than these properties, several others have been visited and may be taken over in the future.

*Copper.* A great deal of interest has been shown in the copper deposits of the western counties. The Fontana and the Cullowhee mines are being operated by the Ducktown Chemical and Iron Company and the Tennessee Copper Company respectively. From six to eight carloads of ore are shipped daily. Other properties, as the Adams-Westfelt in Swain County, the Atkins and Clark properties in Haywood County; and a property near Franklin, Macon County, have been optioned and prospected to considerable extent. If present plans of a large company mature, in all probability, concentrating plants, and possibly a smelter, will be located in the western section of the State. Other than the above mentioned properties, several others, as Betts Gap, Waryhutta, Gunstocker, Ore Knob, Elk Knob, Copper Knob, Union Copper, etc., have been visited during the past few months by representatives of large companies.

*Tin.* The tin properties in the vicinity of Lincolnton and Kings Mountain have been prospected considerably during the past year. A small twenty-ton concentrating plant has been built near Kings Mountain.

*Iron.* The high grade magnetic iron deposits of Mitchell, Madison, Avery and Ashe Counties have been investigated to some extent during this year. Several of the hematite iron deposits in Ashe, Alleghany and Gaston Counties have been examined.

*Manganese.* On account of the tariff on manganese two or three manganese properties in Gaston, Cherokee and Transylvania Counties have been prospected and developed to some extent. One property in Cherokee County is being developed by the Interstate Metal & Ore Corporation.

#### *Non-Metallic Minerals*

*Feldspar.* Feldspar continues to be one of the leading minerals produced in the State. During the last biennium, one new plant was built at Toe-cane, Mitchell County. This makes a total of five feldspar grinding plants which are operating in this State at the present time. North Carolina continues to produce over 50% of the feldspar consumed in America. Several new properties have been opened up during the year and will possibly increase the production during the next year.

*Mica.* On account of the tariff on mica, there will possibly be considerable activity in this field during the next year or two. During the last biennium, several mica recovery plants and one large mica grinding plant



were built. Several new mines have been opened up and many of the old mica properties have been reopened and are producing high grade mica. Plans are under way at the present time to erect a plant to produce a type of mica known as vermiculite. The company which intends to erect a plant will probably also produce corundum, garnet, and spinel from the Shooting Creek section of Clay County. Vermiculite has not been produced in North Carolina heretofore.

*Kaolin.* This State continues to be the largest producer of residual kaolin clay. During the past two years, several of the old clay washing plants have been rebuilt. Also in connection with these clay washing plants, several mica recovery plants have been completed. Two new clay properties have been discovered and plans are now underway for their development.

*Talc.* Considerable activity has been shown recently in the talc properties in this State and one new plant has been built at Marshall, Madison County. The old talc properties near Hewitts, Swain County, are being reopened and several carloads of talc have been shipped. Three other companies are also opening properties in the talc belt which extends through Cherokee County. A large pyrophyllite deposit, a mineral similar to talc, has been taken over by the Tallassee Power Company and considerable material has been produced by that company. The entire output of the mine has been used by the company locally.

*Kyanite.* Plans are at present under way for development of large kyanite deposits in Yancey County near Burnsville. The company reports that all tests have been completed and that a concentrating plant will be erected soon. This mineral has not been produced commercially in this State up to the present time.

*Granite.* The production of granite in North Carolina continues to be one of the most important mineral industries in the State. The new Arlington Memorial Bridge at Washington, D. C., is to be constructed chiefly of North Carolina granite. A Georgia company recently acquired large granite properties in the vicinity of Salisbury and expects to build a plant soon.

*Marble.* In Cherokee County, one company opened a marble quarry. A small plant has been erected. Plans are also under way for the development of other properties in the vicinity of the town of Marble.

*Sandstone.* A sandstone quarry has been opened near Sanford, in Lee County. The stone produced from this quarry is a high grade material and material similar to this was used in many of the older buildings of the State. A member of the company stated he expected to produce this stone on a large scale in the near future.

A complete summary of the mining industry in North Carolina covering the years 1927 and 1928 has been prepared by the State Geologist and issued as Economic Paper No. 63. This report gives the locations of the principal mineral deposits of the State, alphabetically by counties. Also it gives the statistics of production for these two years as well as a brief outline of the status of each industry.



*Recommendations*

An appropriation should be granted to prepare a reliable geological map of the State. There has been no map covering this State since 1892. Reports covering the feldspar industry of the State should be made. This State produces about 52% of that produced in the United States and the Department does not have any bulletins or publications of any kind available for distribution. Due to the continued interest in the copper deposits of the State, a report should be made covering these deposits. We have little or no information relative to any of these properties.

DIVISION OF MINERAL RESOURCES RECEIPTS AND DISBURSEMENTS  
Biennial Period Ending June 30, 1930

	1928-29	1929-30
301 Salaries and Wages.....	\$ 4,185.38	\$ 4,920.00
302 Office Supplies.....	50.25	38.94
303 Postage, Tel., Exp., and Freight.....	52.49	53.34
304 Travel Expense.....	1,863.80	1,635.18
305 Printing and Binding.....	1,352.45	9.64
306 Equipment.....	62.08	.....
General Expense.....	17.20	.....
Total Expenditures.....	\$ 7,583.65	\$ 6,657.10
Less Receipts.....	19.39	.....
Appropriation.....	\$ 7,564.26	\$ 6,657.10

## DIVISION OF PUBLIC RELATIONS\*

PAUL KELLY, *Manager*

Two fields of endeavor have been emphasized by this Division during the biennial period just ended. First, it has served as an educational bureau of the Department for the purpose of impressing upon the people of the State the necessity of conserving their natural resources; and second, it has served as a clearing house for general information regarding the State to encourage the development of the unexploited resources.

In carrying out its program of dissemination of facts about the State and its resources, the Division has made use of a wide variety of mediums including the daily and weekly press, photographic services, trade and professional journals, special publications, radio, and personal addresses.

Because of the limit of facilities, it has been impossible to carry out an educational campaign on a scale commensurate with the demands of the Department's program. Attention is here called to the fact that no funds have been available for paid advertising, and most of the space obtained in various publications has come through reading matter run free of charge.

Space has been freely given by the State press to materials made available by the Department and distributed through the various news agencies including the Associated Press, the United Press, the Association of Afternoon Daily Newspapers, special correspondents, and special staff representatives. Any measure of success obtained by the Division was made possible by the coöperation of the State Press, always progressive and ready to run articles that are constructive and that will aid in the development of the resources of the State.

During the period covered by this biennium, a total of approximately 600 articles has been prepared for the daily and weekly press of this State. These articles have revealed to the public the activities of the Department, and have had for their purpose the enlightenment of the people as to the purposes and objectives of the Department of Conservation and Development. They have carried the various features of work of the Department to the people in order to enlist their intelligent and active coöperation.

These articles have included straight news stories and features and human interest stories, a diversification in type being followed to give as wide a range of appeal as possible. The Division has offered only articles with some special item of interest, and has not attempted to have published those that did not meet the standards set by the press.

The Division has also met requests for numerous articles for special editions of many of the newspapers of North Carolina. Efforts have been made to meet every request for articles, although in some cases considerable research is demanded for efficient handling of the subject.

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\*Following the death of Park Mathewson, Assistant Director and Statistician, the Division of Public Relations was consolidated with the Division of Commerce and Industry, and the manager of the former Division was placed in charge of the consolidated Divisions.

*"Conservation and Industry"*

This Departmental publication has been issued monthly, 24 numbers having been printed and distributed. The mailing list has been revised each year in order to obtain the most effective distribution possible. Return cards were sent out with a request that the recipient report on his desire to continue on the mailing list. By this means, and the elimination of ineffective names, approximately 1,200 names were dropped from the list and replaced by others.

The press run of the publication is 5,000, and the regular mailing list includes some 4,950 names. This leaves about 50 copies to be distributed on special request and for the files of the Department. With the limited press run, it is impossible to meet the demands for the publication regardless of the merit of those who apply. If the present limit of the magazine is continued, it has reached the full scope of its distribution.

Should only a slightly larger provision be made for the publication, its service could be increased greatly at a small proportionate cost for the additional copies. A cheap grade of paper has been used for stock, and it is believed that an improvement in its quality will add materially to the attractiveness of the publication.

Every angle of the Department's work is covered in the periodical and activities of all Divisions are reviewed. Its objective is to give a complete representation of the State's conservation and development program. By means of a regular feature introduced during the last few months, ample opportunity is given to the field force of the Department to find expression and for the public to give its ideas and offer suggestions.

*Special Publications*

Projects of this class have been limited during the two-year period. Two bulletins have been prepared by this Division, and help has been extended to other Divisions in this line.

The two bulletins prepared by the Division are "A Conservation Program for the American Legion" and a Home-Coming folder. In addition to these, much data have been furnished for publications issued by others agencies in this and other States.

Means of publishing a travel and tourists' guide of North Carolina, for which the title of "Where to Go and What to See in North Carolina" has been proposed, have not yet been found. Material and photographs which have been assembled over a period of about two years are available, and with a comparatively small amount of work all other necessary data can be assembled.

Such a publication would meet a constant stream of requests for touring information, and it is believed that it would increase greatly tourist interest in North Carolina.

It is proposed that a map keyed with the locations of outstanding points of scenic, historical, and industrial interest be featured in the publication. Other maps would show the location of field activities of this Department and of the entire State government. The outstanding feature of the publication would be photographs of such attractions and institutions as have



been mentioned. Only brief lines would be required to identify each photograph which would tell their own story and depict their attractions. Such a publication, it is believed, would not only serve to attract outsiders but would help to acquaint the people of North Carolina with their own resources and history.

It is believed that the potentialities of service of such a booklet justifies serious consideration as the next major publication of the Department. No doubt, as an investment, it would return to the State many times the cost of printing and distribution.

### *Game and Fish Advertising*

During the hunting season of 1928 and 1929, series of advertisements setting forth the attractions offered by North Carolina to sportsmen from other states were run in leading sporting publications of the Nation. The advertisements were in the form of illustrated displays, planned by this Division and run immediately before and during the principal hunting seasons in the State.

Numerous inquiries were received in response to the advertisements, and it is known that many sportsmen were attracted to the State through their influence and possibly some made investments. Some of the results of the advertisements are reflected by the increase in sale of non-resident hunting licenses. During the season of 1927-28, 827 non-resident licenses were issued; 1,221 in 1928-29; and last season 1,275.

Approximately \$1,200 was spent for this class of advertising in 1928, but this amount was cut down to \$465 in 1929. Along with the paid advertisements run by the Department, news items were also furnished to the various publications.

### *Radio Programs*

Among the various means of reaching the people with conservation messages, radio has proved highly effective. A regular schedule of broadcasts, averaging more than one for each week of the biennium, has been carried out by the Department. This Division was made responsible for the broadcasting program by the Director, and in this work has been given the active coöperation of the other Divisions.

The Department has been allotted time each week on the schedule of Station WPTF in Raleigh; and other stations including WBT, Charlotte; WWNC, Asheville; and WSJS, Winston-Salem have been generous in the assignment of the time for conservation broadcasts.

In addition to the regular weekly broadcasts from the Raleigh station, the Department has sponsored daily talks during Carolina Forest Week for the two years of the biennium over WBT and WWNC. Although WSJS at Winston-Salem was established since the last observance of Carolina Forest Week, it has made available to the Department any desired facilities for carrying on its program.

Radio has provided means of telling thousands of people of the State's conservation program. North Carolina stations have given generously of their facilities for this purpose, and it is believed that it has been effective in carrying forward the objectives of conservation.

### *Photographic Service*

Limited facilities have prevented the full utilization of this medium of advertising the resources of the State and of teaching conservation. Only a few photographs have been purchased, these being used entirely in cases of emergencies where their service brought returns far beyond the cost.

Most of the photographs were contributed by Chambers of Commerce and local booster organizations and others made by the personnel of the Department. Although these organizations have been generous in supplying photographs, this method is not adequate nor entirely economical in the long run, since opportunities to obtain valuable publicity for the State are often lost because it is on many occasions impossible to find the type of photograph desired. Repeated calls are made on those agencies that have coöperated with the Department in photographic service for duplicates, and frequently the supply of the pictures was found to be exhausted.

The Division needs a set of negatives of representative views taken throughout the State for its files. Equipped in this manner, it would be possible to obtain prints for meeting any number of requests that might arise. A single print can seldom serve more than one publication, and, therefore, negatives of the most popular views are economical since they are permanent assets and can provide an unlimited number of prints.

Pictures often tell a story more effectively than can words, and a good photograph is almost always in demand. Publication of cuts can on many occasions be obtained when an article would not be run. It is hoped that means of developing the photographic service of the Department may be found. A program of this nature is an investment that can be made at a minimum of cost in proportion to the results that may be expected.

### *Home-Coming Program*

The General Assembly of 1929 recommended that the period of the State Fair, October 12-19, 1929, be set aside as Home-Coming Week, an occasion for which all native North Carolinians would be invited to return to the State to observe the progress that had been made during their absence.

A committee was appointed by Governor O. Max Gardner for the purpose of working out plans for this occasion, and the Director of the Department of Conservation and Development was made secretary. Much of the detail of the program, therefore, was carried out by the Department under the supervision of the Director.

One of the largest tasks in connection with the celebration was the compilation of a list of names of former North Carolinians. Approximately 13,000 of these received invitations to return to their native State to take part in the program of the week. These invitations were mailed out by this Department. A folder recounting the progress of the State was prepared by this Division which also took an active part in the program for the celebration of the occasion.

### *Miscellaneous*

Among the duties of the manager of this Division is that of acting as Secretary of the Board of Conservation and Development. He is responsi-

ble for the records of its meetings. The authority of the Board in passing regulations governing commercial and inland fisheries and game makes it necessary that these minutes be kept accurately; and all legal requirements, including the tabulating and advertising of regulations, are carried out by the secretary.

Regulations enacted by the Board have been published both in full and digest form and made available at the request of any interested person. On several occasions, the secretary has been summoned to court to verify various features of the regulations.

Articles on the resources and opportunities offered by North Carolina have been prepared for many leading general, class, technical and trade journals during the biennium.

Five reels of game and fish pictures for educational use were released near the first of the biennium. This Division assisted in planning these motion pictures and prepared their titles. Posters, digests of laws and bulletins have been compiled by the Division for use in the educational program of the Department.



## DIVISION OF WATER RESOURCES AND ENGINEERING

### DIVISION PERSONNEL

THORNDIKE SAVILLE, *Chief Engineer*  
 CHAS. E. RAY, JR., *Principal Assistant Engineer*  
 H. A. SCHMITT, *Assistant Engineer*  
 J. T. BROWN, *Assistant Engineer*  
 L. J. HALL, *Assistant Engineer\**  
 H. A. NELSON-J. W. WADSWORTH, *Coöperative Students†*  
 ESTELLE FULLER, *Senior Stenographer*  
 LAURETTA MCGEE, *Junior Stenographer*

#### *Introduction*

Since 1927 the activities of the Water Resources and Engineering Division have been distributed among the following projects:

1. Stream Gaging
2. Power Studies
3. Hydrologic Investigations
4. Coast, Ports, Waterways
5. Stream Sanitation and Conservation
6. Chemical Water Analysis
7. Drainage District Administration
8. Underground Water Investigations
9. Mapping and Surveying
10. State Hydraulic Engineering
11. Dams

During the first years of the Division's existence from 1921 to 1925, its activities were almost entirely confined to stream gaging and water power investigations, and it was able to concentrate its efforts with relatively little interference from miscellaneous requests for service. With the extension of the activities of the Department and the rapid industrialization of the State, the services required of the Division have grown constantly more complex, and have increased at a rate entirely out of proportion to funds available. Especially during the past biennium the Division has had to extend its efforts greatly to make studies of (1) stream pollution as affecting fish life and discharge of industrial wastes; (2) construction of dams and wells for State institutions; (3) surveys and reports for various other State Departments, such as the Highway Commission, State Board of Health, State Prison, and others; and (4) investigations relating to ports, waterways, the protection of beaches from erosion, and the closing of inlets. The result has been that while the Division has been very properly looked

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\*On full time assignment with the District Office of the United State Geological Survey in Asheville, which coöperates with the Department in stream gaging.

†Student engineers employed alternately who together in point of value are roughly less than the equivalent of one young inexperienced engineer.

A customary procedure of several years standing is the employment of two or three additional engineers for summer field work.

to for engineering service for State activities other than those relating to highways and health, the burden upon the technical personnel has become such that normal duties cannot be handled efficiently on account of increased requests for service coincident with a decrease in funds from those voted by the Legislature. A perusal of the digest of the Division's activities during the biennium will make evident the fact that if normal demands upon this agency of the State are to be met, an increased personnel is required.

### *Stream Gaging*

*New Stations.* This fundamental activity of the Division has continued to expand during the biennium in spite of decreased State appropriations. On June 30, 1928, there were 50 gaging stations in operation, of which 28 were equipped with recorders. On June 30, 1930, there were 75 stations in operation, of which 45 were equipped with recorders. This represents the largest number of gaging stations ever operated in any southern State.

During the biennium a total of 791 measurements at regular gaging stations were made as compared with 522 for the preceding biennium.

This increase in stream gaging activities has been accomplished in spite of a marked decrease in State appropriations available for this work. It has been possible only on account of two special factors which will largely disappear during the next biennium, namely (1) concentration on field work to exclusion of office work on compiling records, and (2) to special surveys of Army Engineers. It was necessary during the biennium to make measurements at new stations installed from municipal and power company funds in 1928, and in particular to make a large number of special measurements during the unusual floods of September-October, 1929. In October, 1929, 62 measurements were made, the largest ever recorded in the State for a single month. As a result, compilation of records is badly in arrears, and publication required by cooperating parties is held up.

*Army Coöperation.* Under the provisions of a special Congressional Act, the Army Engineers were granted funds for making flood control, navigation, and power studies on a considerable number of streams in the State. As a result, they provided funds for erecting nearly all of the new gaging stations reported for the biennium and paid for the entire operation of 29 stations. Already funds for operation of two stations have lapsed, and during the next biennium Army funds will cease for at least 20 more stations. The large installation and rating cost, amounting roughly to \$18,000 (as compared to \$3,300 for the preceding biennium) will remain to benefit the State only if State funds are made available to care for one-half the operating cost, the other half to be carried by the U. S. Geological Survey. At least 20 stations already installed and partly rated will have to be abandoned during the next biennium if additional State appropriations of \$4,500 per annum are not received.

*Status of Stream Gaging.* The status of coöperation in stream gaging is indicated in Table I. It will be observed that only 7 stations out of 75 are operated wholly on a 50-50 basis by the U. S. Geology Survey and the Department of Conservation and Development. Of the remainder, 21 stations

are operated in coöperation with municipalities, industries, and power companies which pay one-half the operating costs, the other half being paid from State and U. S. Geological Survey funds. The entire cost of the Federal Power Permittee stations are carried by the power companies.

The status of stream gaging work in the State is shown in condensed form in Table II. North Carolina is fortunate in having a number of long period stream gaging records.

*Use of Records.* An increasing use of the stream flow records has been evident on the part of power companies, municipal water departments, Federal and State agencies, and private engineers. Delay has occurred in furnishing records due to insufficient office personnel and lack of any funds for printing. Daily stream flow records must cover at least a 10 year period to be of much significance, and longer periods are very desirable. Reference is made elsewhere to effects of length of period of record upon accuracy. Stream flow records are in almost daily use in studies of (1) Municipal Water Supply, (2) Power Development, (3) Dilution afforded to pollution from sewage and trade wastes, (4) Industrial Water Supply, (5) Drainage Projects, (6) Flood Control Projects, and (7) Navigation Improvements. In all of these, basic accurate records of long period discharge form the fundamental basis for economic design.

TABLE I. COÖPERATION IN STREAM GAGING IN NORTH CAROLINA  
June 30, 1930

Active Stations—75.

In coöperation with:

1. Municipalities—21.

a. Maintenance, and in some instances, establishment.....13  
b. Establishment only..... 8

2. Chattanooga District Office Army Engineers—14.

a. Maintenance, and in some instances, establishment.....14  
B. Establishment only..... 0

3. Wilmington District Office Army Engineers—11.

a. Maintenance, and in some instances, establishment..... 9  
b. Establishment only..... 2

4. Norfolk District Office Army Engineers—3.

a. Maintenance, and establishment..... 3  
b. Establishment only..... 0

5. Charleston District Office Army Engineers—3.

a. Maintenance and establishment..... 3  
b. Establishment only..... 0

6. Federal Power Permittees—4.

a. Maintenance, and in some instances, establishment..... 4  
b. Establishment only..... 0

7. Private Power Companies—7.

a. Maintenance, and in some instances, establishment..... 5  
b. Establishment only..... 2

8. Industry and Individuals—6.

a. Maintenance, and some instances, establishment..... 3  
b. Establishment only..... 3

Total of stations in operation having received some degree of coöperative support.....68

Stations supported entirely by U. S. Geological Survey and Water Resources and Engineering Division..... 7

Total gaging stations operated in North Carolina.....75



TABLE II. CONDENSED REPORT OF STREAM GAGING OPERATIONS IN NORTH CAROLINA.  
JUNE 30, 1930

River Basin	Active Stations in Each Basin	Active Stations Equipped With Recorders	Discontinued Stations	Number of Records Available †	Average Length of Record—Years	Average Size of Drainage Area Above Station† Sq. Miles	Length of Longest Record in Each Basin	Longest Record in Each Basin
Roanoke.....	5	5	4	8	5.0	3,056	18 years	Roanoke at Old Gaston
Tar.....	2	0	1	3	4.0	.....	6 years	Fishing Creek at Enfield
Neuse.....	13	5	3	12	2.5	324	4 years	Flat River near Bahama
Cape Fear.....	16	14	4	20	3.5	883	29 years*	Cape Fear at Fayetteville
Yadkin.....	7	5	8	12	8.0	2,423	32 years	Yadkin at Salisbury
Catawba.....	3	2	13	16	1.5	303	7 years	Linville at Branch
Broad.....	3	3	5	8	2.5	201	4 years	Second Broad at Cliffside. Broad near Boiling Springs.
Savannah.....	0	0	0	0	.....	.....	.....	.....
New.....	2	0	4	5	4.5	231	8 years	S. Fk. New at Crumpler. N. Fk. New at Crumpler.
Watauga.....	0	0	0	0	.....	.....	.....	.....
French Broad.....	12	6	14	25	5.0	182	33 years*	French Broad at Asheville
Little Tennessee....	9	4	10	19	8.0	289	33 years	Little Tennessee at Judson
Hiwassee.....	3	1	3	6	13.0	176	33 years	Hiwassee at Murphy
Total.....	75	45	69	134†	.....	.....	207 years	
Average.....	5.8	3.4	5	10	5.0	807	21 years	

†Values given are approximately correct. Areas not determined as yet for some of the new stations.

\*Record not continuous from date of first operation.

†In general records have not been counted as being available for stations in operation less than a year.

TABLE III-A—CHANGES IN STREAM GAGING STATIONS OPERATED JULY 1, 1928-JUNE 30, 1929  
Water Resources and Engineering Division Cooperating with U. S. Geological Survey

Station	Type	Date of Change	Cooperating Party
STATIONS ESTABLISHED:			
North Fork New River at Crumpler.....	Non-Recording.....	July 11, 1928.....	Appalachian Electric Power Co.
East Fork Deep River near High Point.....	Recording.....	July 27, 1928.....	City of High Point
North Fork Buffalo Creek near Greensboro.....	Recording.....	August 27, 1928.....	City of Greensboro
South Fork Buffalo Creek near Greensboro.....	Recording.....	August 30, 1928.....	City of Greensboro
Reedy Fork Creek near Gibsonville.....	Recording.....	September 7, 1928.....	City of Greensboro
Deep River near Randleman.....	Recording.....	September 8, 1928.....	City of High Point
Haw River at High Rock Mill near Beneja.....	Recording.....	October 5, 1928.....	City of Greensboro
Tar River near Nashville.....	Non-Recording.....	October 18, 1928.....	U. S. Army Engineers
Haw River at Haw River.....	Recording.....	October 22, 1928.....	Cities of Burlington-Graham
Catawba Creek at Gastonia.....	Non-Recording.....	October 28, 1928.....	City of Gastonia
Rock Fish Creek near Fayetteville.....	Non-Recording.....	November 20, 1928.....	U. S. Army Engineers
Lower Little River at Linden.....	Non-Recording.....	November 22, 1928.....	U. S. Army Engineers
Contentnea Creek at Hookerton.....	Non-Recording.....	November 23, 1928.....	U. S. Army Engineers
Haw River near Pittsboro.....	Non-Recording.....	November 26, 1928.....	U. S. Army Engineers
Pigeon River at Canton.....	Recording.....	December 6, 1928.....	Champion Fibre Co.
Little Tennessee River at Iota.....	Recording.....	June 27, 1929.....	U. S. Army Engineers
Yadkin River at Wilkesboro.....	Non-Recording.....	April 12, 1929.....	None
STATIONS RE-ESTABLISHED:			
South Fork New River near Jefferson.....	Non-Recording.....	July 10, 1928.....	Appalachian Electric Power Co.
West Fork Deep River near High Point.....	Recording.....	July 25, 1928.....	City of High Point
Fishing Creek near Enfield.....	Non-Recording.....	October 16, 1928.....	U. S. Army Engineers
Cape Fear River at Fayetteville.....	Recording.....	December 1, 1928.....	U. S. Army Engineers
STATIONS DISCONTINUED:			
Sandy Run near Boiling Springs.....	Non-Recording.....	December 31, 1928.....	Cliffside Mills
Catawba Creek at Gastonia.....	Non-Recording.....	March 1, 1929.....	City of Gastonia
Yadkin River at North Wilkesboro.....	Non-Recording.....	April 10, 1929.....	None

July 1, 1928      49 stations were in operation: 27 were equipped with recorders; 22 were of the non-recording type.  
 11 recording stations were established; 10 non-recording stations were established; 3 non-recording were discontinued.  
 June 30, 1929\*    67 stations were in operation: 38 were equipped with recorders; 29 were of the non-recording type.  
 \*An additional station, the Nolichucky River at Poplar is operated in North Carolina by the Chattanooga Office of the U. S. Geological Survey.

TABLE III-B—CHANGES<sup>a</sup> IN STREAM GAGING STATIONS OPERATED JULY 1, 1929-JUNE 30, 1930  
Water Resources and Engineering Division Cooperating with U. S. Geological Survey

Station	Type	Date of Change	Cooperating Party
STATIONS ESTABLISHED:			
Dan River at Leaksville.....	Recording.....	July 11, 1929.....	U. S. Army Engineers
Mayo River near Price.....	Recording.....	July 13, 1929.....	U. S. Army Engineers
Lumber River at Boardman.....	Non-Recording.....	September 18, 1929.....	U. S. Army Engineers
Rocky River near Norwood.....	Recording.....	September 20, 1929.....	U. S. Army Engineers
Roanoke River at Roanoke Rapids.....	Recording.....	February 28, 1930.....	F. P. Proj. 634-Roanoke R. P. Co.
Neuse River at Goldsboro.....	Non-Recording.....	February 25, 1930.....	U. S. Army Engineers
Neuse River at Kinston.....	Non-Recording.....	February 26, 1930.....	U. S. Army Engineers
Contentnea Creek near Wilson.....	Non-Recording.....	February 27, 1930.....	U. S. Army Engineers
Little River at Princeton.....	Non-Recording.....	February 28, 1930.....	U. S. Army Engineers
Jonathan Creek at Cove Creek.....	Recording.....	May 24, 1930.....	Carolina P. & L. Co.-F.P.Proj. 432
STATIONS RE-ESTABLISHED: None.			
STATIONS DISCONTINUED:			
Pigeon River near Crabtree.....	Non-Recording.....	December 31, 1929.....	U. S. Army Engineers
Little Tennessee River at Etna.....	Non-Recording.....	December 31, 1929.....	U. S. Army Engineers
Pigeon River at Mount Sterling.....	Recording.....	March 27, 1930.....	F. P. Proj. 693-Caro. P. & L. Co.
IMPROVEMENT IN EQUIPMENT:			
Yadkin River at Wilkesboro.....	Recording*.....	January 9, 1930.....	U. S. Army Engineers
Haw River at Pittsboro.....	Recording.....	October 14, 1929.....	U. S. Army Engineers

July 1, 1929 67 stations were in operation: 38 were equipped with recorders; 29 were of the non-recording type.

June 30, 1930 75 stations were in operation: 45 were equipped with recorders; 30 were of the non-recording type.

<sup>a</sup>Previously established on April 12, 1929 as non-recording station replacing Yadkin River near North Wilkesboro station which was discontinued on April 10, 1929



*Publication of Records.* In 1924 the Division issued Bulletin 34 containing all stream flow records in the State through 1923. It was planned to issue a supplement every five years, and many requests have been made for publication of the records from 1924-1928 inclusive. Manuscript, tables and diagrams for this important compilation are ready for press, but no funds are available for printing.

*Coöperation with U. S. Geological Survey.* Except in special cases, all field and basic office work in stream gaging is performed by the expert engineers of the U. S. Geological Survey, working from Asheville, in coöperation with the Division. In cases of severe floods or when special measurements are desired, engineers from the Chapel Hill office of the Division are called into service to supplement field work of the U. S. Geological Survey. The Division prepared all data for State publications and handled 218 requests for stream flow data during the biennium.

The U. S. Geological Survey has increased its appropriation for work in North Carolina by \$2,000 in 1929-30, and further increases may be expected in 1930-31 provided State funds are available on a 50-50 basis. The Division has experienced most gratifying coöperation throughout the biennium from the U. S. Geological Survey, under the immediate direction of E. D. Burchard, District Engineer, and Assistant Engineers A. E. Johnson, Karl Jetter, F. M. Bell, and H. W. Palm. During the period covered, L. J. Hall, a Division engineer employee, has been assigned to the Survey and has worked as one of its employees.

### *Power Studies*

No field investigations of water power have been made since 1925, as the Division has completed preliminary surveys of all potential undeveloped sites of commercial significance. During the past biennium a great deal of unpublished data from our investigations on the Yadkin, Dan, Deep, New and Watauga Rivers has been furnished in connection with investigations of the Army Engineers and Power Companies, resulting in material saving of time and money to these agencies, and stimulating prospects of new developments. Excerpts are given below from a letter from Mr. E. C. Deal, President of the Peoples Light and Power Corporation of New York, which are typical of appreciative statements received by the Division indicating the value of its water power investigations.

“Regarding the reports prepared and issued by the Conservation and Development Department of the State of North Carolina on the power possibilities along the upper Dan River, I thought the Department would be interested to know that this report has produced good results in that it has been used effectively in bringing the potential power possibilities of the upper Dan River to the attention of New York banking interests with which I am associated to the extent that they have been willing to spend the required money to make further detailed investigations, and upon the results of these further investigations they have acquired option on necessary land and power sites to develop practically all the power sites along this part of the river and in all probability will carry out these developments within the next two or three years. I think I am fully

justified in saying that the pioneering done by the State of North Carolina Conservation and Development Department as herein mentioned, will have been largely responsible for interesting capital much sooner than otherwise would have been the case."

Sales of maps and diagrams indicating the results of the Division's earlier surveys have amounted to over \$50.00. It is hoped during the next six months to complete for publication abstracts of water power reports on the rivers mentioned above.

During the biennium, statistics have been compiled and published in "Conservation and Industry" covering annual summaries of new water and steam power developments, power output, and consolidations of power companies. The Division's power map of the State has been kept up-to-date, but no funds are available for a new edition. Efforts of the Division to stimulate greater interest in rural power development, in which North Carolina lags behind other agricultural states, have not met with success either from power companies or other State agencies.

The past biennium has been a period of unusually high rainfall, which has resulted in the production of the greatest amount of hydro-electric power ever produced in this or any other southern State, and the greatest proportion of total power (93% in 1929) produced by water since 1921. Total output of public utility plants increased to 2,373,000,000 kw.-hrs. in 1929; North Carolina ranking first in the South and ninth in the United States in this respect.

Only one large hydro-electric plant was completed during the biennium, the Waterville plant of the Carolina Power and Light Company on the Pigeon River. This plant has an installed capacity of about 145,000 H. P. and develops a total head of 861 feet, the greatest of any plant east of the Rocky Mountains. The River Bend steam plant (150,000 H. P.) of the Duke Power Company, on the Catawba was also completed. Total developed hydro and steam power in the State now amounts to 936,860 H. P. and 743,367 H. P. respectively. The State ranks third in the United States, and first in the South in developed water power. There is likely to be about equal new construction in hydro and steam power plants in this State in the future. New hydro plants proposed for construction during the next biennium include a 45 ft. dam of the Virginia-Carolina Power Company on the Roanoke River (about 56,000 H. P.), and the Nantahala plant of the Nantahala Power Company, which will develop over 900 ft. fall on the Nantahala River, and produce about 66,000 H. P.

Considerable attention has been required in connection with a proposed Federal Power license to the Virginia-Carolina Power Company on the Roanoke River near Roanoke Rapids. The Division has represented the interests of the town of Weldon, the State Board of Health, and the Fisheries Division in attempting to have the license include provision for protecting fish life and municipal water supply. The status of Federal Power projects in the State is shown in Table III.

TABLE IV. FEDERAL POWER PROJECTS--NORTH CAROLINA  
June 30, 1930

Project Number	Company	River	Installed H.P.	Status
432	Carolina Power and Light Co.....	Big Pigeon.....	145,000	License (50 years) issued November 23, 1926
532	Thompson Power Co.....	Hiwassee.....	259,000	Application withdrawn December 11, 1926
542	Central Power Co.....	New and Reddies.....	80,000	Rejected September 15, 1926
575	Eastern States Development Co.....	New and Fisher.....	300,000	Rejected September 15, 1926
667	Parker, J. A.....	Cape Fear.....	.....	Rejected December 14, 1926
693	Highlands, Town of.....	Cullasagee.....	600	License (50 years) issued July 19, 1926
715	Shuford and Laxton.....	Wilson Creek.....	5,028	Permit (3 years) issued November 16, 1926
718	Federal Power Co. of Tennessee.....	Nolichucky-Toe.....	72,000	Conflicts with 732
902	Virginia-Carolina Power Co. of Virginia.....	Roanoke.....	50,000	Application rejected June 14, 1929
916	Virginia-Carolina Power Co. of North Carolina, Site A.....	Roanoke.....	87,000	Preliminary permit issued June 14, 1929
916	Virginia-Carolina Power Co. of North Carolina, Site B.....	Roanoke.....	56,000	Preliminary permit issued June 14, 1929



Legislation is again requested giving to the Division authority to require reporting of power data by public utility and municipal plants, and to assess such plants with part of the cost of administering the water resources laws. Reference is again made to past suggestions as to need for a State Water Power Law similar to those in most of the larger water power States. Federal encroachments upon State rights in its streams is bound to come, and will be desirable, unless the State acts to protect the interests of the public in the most beneficial use of the resources of its streams.

### *Hydrological Investigations*

*Rainfall.* During the biennium efforts have been made to complete a Bulletin on Rainfall in North Carolina, to which the time of Research Assistants has been largely devoted. Tables of monthly and annual rainfall at over 150 stations for the entire period of record have been assembled and analyzed; a new map showing distribution of annual rainfall over the State has been prepared; studies of cycles in rainfall have been made; curves showing seasonal distribution of rainfall at selected stations have been prepared; and studies of rainfall intensity are now in progress. Publication of the Bulletin will be possible in 1931 if printing funds are available.

*Special Studies.* Measurements of evaporation at Lakes Michie and Badin have been continued. These are the only water exaporation stations in the south, and numerous requests for data from them are received. Measurements of silting at these lakes are hoped to be made in 1930. Assembly of data from the rainfall-runoff, evaporation, silt, and forest cover investigation at Lake Michie has been held in abeyance due to lack of funds in spite of requests by the city of Durham. Request for a similar study in connection with the High Point Water Supply has had to be refused, even on a 50-50 basis of costs.

A special study of rainfall-runoff relations on the Yadkin River has been made by Mr. Ray. A significant result of this study is the indication of value of long term records. Averages of ten year flows varied from 10% above to 14% below the 32 year mean. Thus even a 10 year records of hydrological events may provide misleading data if not properly interpreted.

With the rapid industrialization of the State, the need for detailed studies of hydrological phenomena is amply justified, and can only be economically undertaken by a State agency upon a coöperative basis.

### *Coasts, Ports and Waterways*

*Coastal Studies.* For several years the Division has conducted summer field surveys at selected points on the coast to investigate the magnitude of changes which were taking place, and to develop sufficient knowledge of the forces at work to enable proper remedial measures to be taken. Our studies have indicated serious erosion at some important points, and marked accretion elsewhere. Investment in coastal property is reaching considerable proportions, and the protection of our coast is a matter of State concern and must be considered from a broad State standpoint. An immediately practical result of certain of our studies is a request from one important resort on the coast to indicate the best methods of protecting the

beaches from erosion, previous structures having proved only partially successful. Accretion and sand movement causing closure of inlets is of equal importance to erosion, and has already seriously affected the fishing industry in certain of our sounds. The Division believes that sooner or later serious measures must be taken by the State in coöperation with local interests to protect and preserve the valuable beaches, inlets, and sounds of the State. Investigations which have already been made have been amply justified, and ought to be increased in scope.

The present Rivers and Harbors Bill contains a Section providing for Federal assistance in these studies, upon an equal basis of expenditure. It is consequently hoped to increase the scope of coastal investigations materially during the next biennium both from increased State funds and equal funds from Federal sources. The Chief Engineer of the Division had some part in writing the Section of the Rivers and Harbors Bill referred to, as he has been engaged as consultant during the past year to a special Army Board investigating beach erosion and sand movement. It is hoped that sufficient funds may be available during the next biennium to permit carrying out the provisions of Chapter 264, Public Laws of 1925, directing an investigation of Roanoke and adjacent sounds, with reference to maintenance of inlets and promotion of the fishing industry.

*Port and Waterway Studies.* During the biennium, the Division presented a brief before the Rivers and Harbors Board, which, with other testimony resulted in an order for a re-survey for a third lock and dam in the Cape Fear River. A map was prepared showing inland waterways in the State. Articles descriptive of our ports and inland waterways are to be prepared for the meeting of the Atlantic Deeper Waterways Association at Wilmington in October, at which time will be celebrated the completion of the Inland Waterway from Beaufort to Wilmington.

*Future Activities.* It is felt that the Division should materially expand its service to the eastern part of the State through greater efforts in studying and making known the coastal, port and inland waterway situation. Great opportunities exist for increasing the productivity of fishing in our sounds, of protecting and maintaining our coasts and inlets, of utilizing more advantageously our inland waterways, and of developing greater ports. The Division is in a position to furnish needed engineering assistance in these matters if personnel are made available.

#### *Stream Sanitation and Conservation*

Reference was made in the last biennial report to the creation of a State Stream Sanitation and Conservation Committee designed to correlate and make more effective the concern of the State Board of Health and Department of Conservation and Development in matters relating to stream pollution. During the past two years this informal agreement has worked well in bringing into accord the interests of these two State agencies, and in promoting the efficient utilization of the resources of each. In general the Water Resources and Engineering Division has handled initially all complaints arising from alleged damage to fish life, has conducted necessary hydrological studies, and has invoked the powers of the Department when



required. The Engineering Division of the State Board of Health has handled initially complaints relating to pollution as affecting public water supplies or sewage treatment processes, and has conducted the detailed laboratory and analytical studies.

An increasing number of complaints is constantly arising relative to injury to fish life from sewage and industrial wastes. The limited personnel of the Division have been unable to cope satisfactorily with the situation, which has to be approached from various angles, but several important investigations have been undertaken successfully. After due investigations, it was found that wastes from the municipal gas plant at Rocky Mount was injurious to fish in the Tar River, and after several conferences, the local officials had new devices installed to prevent the waste from reaching the stream and incidentally recovered saleable products sufficient to pay in large part for the treatment process. Strenuous complaints were received of deleterious effects on fish life in the Tuckasegee River from wastes discharged from industrial plants at Sylva. This case is typical of many the Division encounters. On the one hand, waste products which must be disposed of by a large industry employing many local people and paying a considerable proportion of the county taxes. On the other hand, alleged destruction of fish life and impairment of scenic effect in an important game fishing stream passing through a region developing a large tourist and resort business. The tendency to immediately enact repressive legislation against an important industry is to be discouraged, yet equally important natural resources must be preserved. For nearly two years the State agencies, with the heartiest coöperation from the industry, have been investigating the problem, which is essentially two fold: (a) are the wastes deleterious to fish? and (b) if so, can treatment processes to make them less objectionable be economically operated? The Division has made detailed hydrological studies of flows of wastes, of Scotts Creek, and of the Tuckasegee River, and was loaned an expert from the U. S. Bureau of Fisheries to make a detailed study. The State Board of Health has conducted detailed chemical investigations upon the river and the wastes. The industry has contributed \$2,500 to the cost of these investigations, and is diligently seeking to improve treatment processes to a point where they can be operated without serious loss. It is believed that a solution to this problem will be found by the end of the year. Certainly definite facts will have been ascertained, upon which the Department can base just action. This study is typical of others conducted on the Pigeon and Haw Rivers in coöperation with other industries.

Numerous cases of sudden death of large numbers of fish in various streams have been investigated and reports rendered to the Fisheries Division. Several investigations of this nature are pending at present. The Division is greatly handicapped in this important work by lack of a trained engineering chemist and fish culturist. Matters of stream pollution as affecting fish life involve, among other things, the following factors: (a) stream flow—whether adequate dilution is afforded at varying periods of flow; (b) time of flow—whether stream has time for recovery (usually through oxygen replenishment) between points of pollution or use; (c)



chemical composition of wastes and of polluted water; (d) effect of pollution in varying degrees upon different species of fish; (e) effect of pollution upon small biological life in the stream upon which fish feed. A suggestion is made that in order to enable the Division to cope with this situation and the difficulty discussed in the next section, funds be made available for employment of a part time industrial chemist and of a part time biologist or fish culturist. The relations of the Division with the University make this proposal simple and inexpensive, due to ability to obtain expert assistance immediately at hand.

Attention is called to the provisions of the Legislative Acts regarding stream pollution. Section 1899 of the Consolidated Statutes of 1919 excepts corporations chartered prior to March, 1915, from prohibition against discharge of polluting substances into fishing waters. Chapter 107 of the Public Laws of 1927, excepts dyestuffs and sewage from cotton mills from prohibition against discharge into fishing waters. Under these two exceptions the Department is prevented, in case necessity should arise, from taking any steps to prevent pollution of fishing waters from the very large number of plants coming under these provisions of the statutes. It should be stated that the industries in question have thus far evidenced a most commendable attitude of coöperation with State agencies in attempting to bring about an improved condition from deleterious wastes discharged by them. However, it is felt that these two exceptions are anachronisms, representing unfair treatment as between old and new industries, and as between special classes of industries, and they should be repealed since the State Stream Sanitation and Conservation Committee makes available an unprejudiced fact finding State agency to administer with reason and justice all laws relating to pollution of streams.

### *Chemical Water Analysis*

During the biennium only 58 chemical water analyses have been made, due to lack of any appropriation for this purpose. Requests for Economic Paper 61, Quality of Surface Waters, have continued to be considerable, but the 180 analyses therein reported represent only a small number of streams, and give little indication of fluctuations of quality throughout the year. Attempts have been made to have a limited number of analyses made by the State Board of Health, but due to lack of funds and press of other duties for this organization, little success has attended the effort. The Division has had to refuse numerous requests for information on chemical water quality from new industries and others. It is suggested that funds be provided for a part time industrial chemist, whose duties would be equally distributed between studies of fishing waters and chemical water analysis.

### *Drainage*

The Drainage Acts of the State place certain responsibilities as to origin-ation of drainage districts upon the Department. These acts have not been successful in preventing some unfortunate attempts at creating districts, nor in providing for proper maintenance. The result is that there is at

present the greatest difficulty in selling drainage bonds. The Division has recommended changes in the Drainage Law to require its approval of plans for new districts, and giving it supervision over maintenance. Pending these changes, the Division has predicted its approval of the engineer upon submission of satisfactory plans.

During the biennium several plans have been reviewed, and in some instances changes required. Assistance has been rendered to several proposed districts. A study of the entire drainage situation in the State is now in process, and a report will be made to the Director prior to the meeting of the Legislature in January, 1931.

### *Underground Water Investigations*

During the past year, the Division reported upon an underground water supply for State Sanatorium and supervised the drilling of a large gravel wall well there. The well was not successful, due in part to the character of the water bearing stratum. The contract for the well was cancelled with no expense to the State.

A report was rendered upon a well water supply for the Blind Institute near Garner, chiefly with the assistance of the State Geologist.

The Division has repeatedly requested appropriations for a thorough investigation of the underground water situation in the east, where not only are such sources often the cheapest to develop for industrial or municipal use, but in some cases are the only possible source. The U. S. Geological Survey has agreed to conduct such a study in coöperation with the Division, and to bear one-half the estimated cost of \$12,000 per year for two years. It is again recommended that funds for this project be provided.

Legislation is again requested giving to the Department certain powers over well drilling operations, in the interest of conserving the ground water supply and providing data on ground water conditions. The act would be self supporting through license fees, and it has the approval of most of the well drillers of the State.

### *Mapping and Surveying*

During the biennium surveys were conducted and maps prepared of the following projects:

Salters and Jones Lakes in Bladen County.

Lake Rim and Stedman Hatchery property in Cumberland County.

Additions to Fort Macon State Park.

Linville Caverns in McDowell County

River Dikes at Caledonia State Prison Farm in Halifax County.

Wrightsville Island in New Hanover County.

The Division has repeatedly urged the completion of the topographic map of the State, a matter of the utmost importance in studies of water supply, water power, city and regional planning, highway location, and industrial developments. North Carolina has only about 36% mapped as compared with over 90% in Virginia. Such mapping is done by the U. S. Geological Survey on a 50-50 basis. During the past year the North Carolina Society



of Engineers, at the instance of its President, George F. Syme, took a forward step in appointing a State Survey Committee. This Committee has recommended that as the first action looking toward completion of the topographic map of the State, the fundamental triangulation and level lines required be undertaken by the U. S. Coast and Geodetic Survey during the next two years. The cost is estimated at \$27,500 to the State and \$82,500 to the Coast Survey. It is believed that the Department should heartily endorse this effort, especially as the Department is by law the State Agency charged with coöperation with Federal agencies in topographic surveys.

### *State Hydraulic Engineering*

During the biennium the Division has been called upon for special hydraulic engineering services by the Fisheries Division, the Highway Commission, the State Board of Health, and other State agencies. At present there is being conducted a survey of the dikes protecting the State Prison Farm at Caledonia from inroads by the Roanoke River. Extensive repairs and improvements to the dikes are indicated, and will probably be carried out under the general direction of the Division.

Increasing requests from various State agencies for special hydraulic engineering service by the Division have made it desirable to increase our personnel by one part time assistant engineer to take care of these legitimate demands. Funds for the purpose are to be requested for the next biennium.

### *Dams*

The Division has been called upon during the biennium to design and construct a dam for a water supply at State Sanatorium. A previous dam, costing about \$7,500 failed by undermining and the institution was in serious straits for water supply. A more or less temporary earth dam constructed under the auspices of the Division cost only \$2,000 and is believed to be much safer than the dam it replaced, as it has already withstood several severe floods.

At the request of the Budget Bureau, the Division inspected plans and construction for dam and power house on the Tuckasegee River for the Western Carolina Teachers' College.

During the biennium the Division has been called upon to report upon fishways in dams, to furnish designs and specifications for these, and to supervise construction. It is probable that the Division will be called upon more in the future for advice as to the construction of small dams for fish ponds and resort purposes, and for action as to inclusion of fishways in dams. The Department is now held responsible for jurisdiction relating to fishways, but statutory authority is conferred on County Commissioners and the State Department of Agriculture. It is recommended that existing laws be repealed, or amended, giving sole jurisdiction in this matter to the Department.

During the biennium several failures and near failures of dams have occurred in this and other States. In all cases the dams in question have not received inspection by any State agency. Many States now have State inspection of dams, and this practice is recommended by a group of public



utility representatives and others before the American Society of Civil Engineers. The Division has prepared and recommends for adoption, a law requiring it to exercise approval over designs for and inspection of construction of all dams heretofore or hereafter built in the State. Such a law would carry a small license fee, as is done in other States, to make it self-supporting.

### *Airports*

The Division mentioned a new activity in its last Biennial Report, namely, the stimulation of proper development of airports and airways in the State. A good deal had been done to further this project, but legislation designed to make it effective and self-supporting met with strenuous objection from another State agency, and was not introduced. In consequence of no funds being appropriated for this activity, it has lapsed, although contact is still maintained with the Federal agencies concerned with the matter.

### *Financial Statements*

There is given in Table V the amounts of money expended on the several projects making up the activities of the Water Resources and Engineering Division. It is in the prosecution of these objects that the money appropriated in terms of personal service, travel expense, equipment, etc., are disbursed. A statement of Division expenditures in terms of these accounts appears as a part of the consolidated statement for the Department in the back of the Report.

Total disbursements were \$38,507 in 1928-29 and \$29,982 in 1929-30, while expenditures from appropriation amounted to \$27,340 and \$26,359 for the two years, respectively. The decrease in total of disbursements was accounted for by decreased financing of stream gaging stations for which the greater part of the cost has been put up by municipalities and others requiring stream flow records. In the second year, State funds were not available for matching coöperative funds for additional requirements.

The Division was required to make a saving of ten per cent in the 1929-30 appropriation, and it was to be anticipated that a twenty per cent saving would be necessary in the year following unless some saving was carried forward from 1929-30. As this is not apparent in Table V, attention is called to the fact that the ten per cent saving was effected as required and a small balance was carried forward to equalize operations in 1930-31. This saving was accomplished only through curtailment in operations, holding up of the printing of stream flow records and other reports, and from the viewpoint of demands made on the Division for services was not justifiable, although necessary on account of budget operations.

### *General Recommendations*

During the next fiscal biennium it is recommended that activities in stream gaging and power studies be maintained as at present. These are the two oldest activities of the Division, and have been brought to a point where relatively little increase in scope of investigations is required.

To relieve engineering personnel of bookkeeping, filing and statistical duties, the appointment of a Senior Accounting Clerk is recommended. There is urgent need for such a person in the Division.

For services required by the Fisheries Division and other State agencies in connection with stream pollution studies, a part time industrial chemist and part time biologist are recommended, with moderate provision for travel.

For Hydrologic Investigations, State Hydraulic Engineering, Mapping and Surveying, and Stream Sanitation and Conservation projects, an additional full time assistant engineer is recommended, with provision for travel.

For Chemical Water Analysis, a part time industrial chemist is recommended. Travel can be cared for by coöperative funds.

For Drainage District Administration, no increase is required provided the proposed amendments to the Drainage Laws are adopted.

For Underground Water Investigations, \$6,000 for each of two years is recommended, to be met by an equal amount from the U. S. Geological Survey, for intensive study and report on the underground water supplies of the Coastal Plain.

For Coastal, Port and Waterway Studies, it is recommended that a material increase in activity be undertaken. There is a very great service to be rendered the State in the investigation and promotion of these projects as described in the report. One full time assistant engineer with provision for field assistance and travel is the minimum that should be requested. An increase of \$6,000 in the Budget for the next biennium is recommended for this purpose.

It is urgently recommended that sufficient funds be made available for the printing of the results of important water resources and engineering investigations. Completed reports cover results of stream flow observations from 1924 to 1928, inclusive, and a comprehensive report on rainfall in North Carolina is already essentially completed and awaiting publication. Reprints of drainage laws of North Carolina are exhausted and a new issue is badly needed. Abstracts of reports on water power surveys and the biennial report on the power situation should be published. For printing these important documents, the sum of \$5,500 should be made available.

The following new legislation is recommended.

1. Amendments to Drainage Act.
2. Law relating to drilling of wells.
3. Repeal of exceptions of certain corporations and industries from laws governing pollution of Fishing Streams.
4. Dam Act.
5. Repeal of existing statutes relating to fishways in dams, and delegation of authority in this matter to the Department.
6. Statute providing that no structures shall be built on or along the coasts, inlets, sounds, or rivers of North Carolina, where the tide rises and falls without securing permission from the Department of Conservation and Development.

TABLE V. DISTRIBUTION OF DISBURSEMENTS BY PROJECTS OF WATER RESOURCES AND ENGINEERING DIVISION

	1928-29	1929-30
P- 0 General Service and Miscellaneous.....	\$ 4,575.00	\$ 8,719.48
P- 1 Stream Gaging:		
Coöperation with U. S. Geological Survey.....	19,728.00*	11,290.62
State publications, inquiries and administration.....	4,251.00	2,669.89
P- 2 Power Studies.....	770.00	389.62
P- 3 Hydrologic Investigations.....	1,133.00	1,129.02
P- 4 Coastal Studies.....	3,920.00	2,487.60
P- 5 Stream Sanitation and Conservation.....	1,606.00	1,113.14
P- 6 Water Analysis.....	220.00	132.44
P- 7 Drainage.....	196.00	247.23
P- 8 Underground Waters.....		188.44
P- 9 Mapping and Surveying.....	1,500.00	351.97
P-10 State Hydraulic Engineering.....	308.00	339.35
P-11 Dams.....	300.00	922.74
Total.....	\$ 38,507.00	\$ 29,981.54
Appropriation.....	27,340.00	26,358.60
Coöperation, sales and other revenue.....	\$ 11,167.00*	\$ 3,622.94

\*Coöperative revenue to extent of about \$9,980.00 included which financed stream gaging construction program.



## DEPARTMENT OF CONSERVATION AND DEVELOPMENT

STATEMENT OF RECEIPTS AND DISBURSEMENTS\*  
Biennium—1928-30

	1928-29	1929-30
<b>I. ADMINISTRATION:</b>		
101 Salary, Head of Department.....	\$ 6,000.00	\$ 6,000.00
102 Salaries and wages.....	5,275.60	11,429.50
103 Office Supplies.....	524.46	476.48
104 Postage, Tel., Ex., and Freight.....	2,603.79	1,433.00
105 Travel Expense.....	1,273.29	1,928.43
106 Printing and Binding.....	15,552.79	3,965.25
107 Repairs.....	24.19	104.49
108 General Expense.....	257.74	1,544.88
109 Equipment.....	327.76	182.13
109-1 Burroughs Bookkeeping Machine.....		1,140.75
Total Expenditures.....	\$ 31,839.62	\$ 28,204.91
Less Receipts.....	620.65	892.89
Appropriation.....	\$ 31,218.97	\$ 27,312.02
<b>II. WATER RESOURCES:</b>		
201 Salaries and Wages.....	\$ 21,379.27	\$ 23,448.02
202 Supplies and Materials.....	1,044.60	734.21
203 Postage, Tel., Exp., and Freight.....	805.84	611.41
204 Travel Expense.....	6,545.03	2,540.46
205 Printing and Binding.....	471.54	590.26
206 Motor Vehicle Operation.....	748.26	683.59
207 Repairs.....	220.80	164.10
208 General Expense.....	522.59	420.65
209 Equipment.....	6,689.45	753.73
210 Exhibits, State Fair.....	80.00	35.11
Total Expenditures.....	\$ 38,507.38	\$ 29,981.54
Less Receipts.....	11,167.44	3,622.94
Appropriation.....	\$ 27,339.94	\$ 26,358.60
<b>III. GEOLOGICAL:</b>		
301 Salaries and Wages.....	\$ 4,185.38	\$ 4,920.00
302 Office Supplies.....	50.25	38.94
303 Postage, Tel., Exp., and Freight.....	52.49	53.34
304 Travel Expense.....	1,863.80	1,635.18
305 Printing and Binding.....	1,352.45	9.64
306 Equipment.....	62.08	
General Expense.....	17.20	
Total Expenditures.....	\$ 7,583.65	\$ 6,657.10
Less Receipts.....	19.39	
Appropriation.....	\$ 7,564.26	\$ 6,657.10

\*The financial statement for the Division of Commercial Fisheries follows the report of that Division and is not included herewith, being a separate fiscal agency.

## STATEMENT OF RECEIPTS AND DISBURSEMENTS—Continued

	1928-29	1929-30
<b>IV. FORESTRY, FISHERIES AND GAME:</b>		
FORESTRY DIVISION:		
Forest Fire Prevention:		
401 Salaries and Wages.....	\$ 25,865.96	\$ 36,300.55
402 Supplies and Materials.....	1,631.72	1,202.31
403 Postage, Tel., Ex., and Freight.....	2,287.43	2,111.31
404 Travel Expense.....	6,298.36	7,078.46
405 Printing and Binding.....	2,182.48	1,306.90
406 Motor Vehicle Operation.....	4,369.03	3,928.40
407 Lights.....	25.45	9.67
408 Repairs.....	115.55	97.36
409 General Expense.....	2,233.92	1,455.18
410 Equipment.....	16,998.36	4,199.93
411 Forest Fire Prevention (45 Cooperative Projects):		
411-1 Salaries and Wages 1,000 Forest Wardens in 45 coöperative projects. 1 County Warden in each project. Average 20 District Wardens in each coöperative project....	32,013.08	25,151.87
411-2 Salaries and Wages, Forest Wardens and Laborers (fire fighters) in 45 coöperative projects. Fire suppression only. (Fire fighters receive 20c per hour).....	9,901.23	20,979.40
411-3 Travel Expense, 1,000 Forest Wardens (Expense car mileage at 7c per mile).....		6,502.02
411-4 Lookout Towers.....		2,506.92
411-5 Cabins.....		248.16
411-6 Telephone Lines.....		1,588.12
411-7 Miscellaneous Fire Fighting Equipment.....		3,764.69
General Forestry:		
412 Salaries and Wages.....	4,689.68	3,351.66
413 Supplies and Materials.....	337.52	97.71
414 Postage, Tel., Exp., and Freight.....	160.62	239.98
415 Travel Expense.....	817.14	566.07
416 Printing and Binding.....	596.66	258.92
417 Motor Vehicle Operation.....	228.53	69.62
418 Equipment.....	96.26	94.05
418-1 General Expense.....	99.75	30.00
Parks:		
419 Salaries and Wages.....	3,430.06	2,660.59
420 Supplies and Materials.....	399.62	20.35
421 Postage, Tel., Exp., and Freight.....	3.05	69.80
422 Travel Expenses.....	242.72	273.02
423 Printing and Binding.....	53.90	33.00
424 Motor Vehicle Operation.....	18.83	14.31
424-1 Equipment.....	76.19	126.25
Planting:		
425 Salaries and Wages.....	4,476.35	6,991.78
426 Supplies and Materials.....	757.33	892.72
427 Postage, Tel., Exp., and Freight.....	91.99	191.89
428 Travel Expense.....	63.99	151.97
429 Printing and Binding.....	12.65	27.04
430 Motor Vehicle Operation.....	268.91	377.85
431 Equipment.....	51.41	577.86
Highway Planting.....	900.00	
Repairs, parks.....	590.17	

## STATEMENT OF RECEIPTS AND DISBURSEMENTS—Continued

	1928-29	1929-30
General Expense, parks.....	\$ 2.50	.....
General Expense, planting.....	5.81	.....
Insurance.....	49.71	.....
State Fair.....	200.00	.....
Total Expenditure.....	\$122,643.92	\$135,547.69
Less Receipts.....	78,111.88	72,045.09
Appropriation.....	\$ 44,532.04	\$ 63,502.60
Inland Fisheries:		
433 Salary Director.....		4,500.00
434 Salaries and Wages.....	23,104.37	19,698.28
435 Supplies and Materials.....	10,832.09	120.41
436 Postage, Tel., Exp., and Freight.....	1,159.29	395.86
437 Travel Expense.....	1,322.00	672.76
438 Printing and Binding.....	1,403.77	837.59
439 General Expense.....	44.68	75.40
440 Equipment.....	2,921.21	106.00
Auto Upkeep.....	1,326.24	.....
Lights and Water.....	70.68	.....
Repairs.....	1,119.11	.....
Additions and Betterments.....	5,327.14	.....
Fair.....	80.00	.....
Morrison Hatchery:		
441 Salaries and Wages.....		4,310.75
442 Supplies and Materials.....		2,484.76
443 Postage, Tel., Exp., and Freight.....		112.33
444 Travel Expense.....		57.31
445 Motor Vehicle Operation.....		218.16
446 Lights.....		49.73
447 Repairs.....		129.59
448 Equipment.....		71.55
Pete Murphy Hatchery:		
449 Salaries and Wages.....		2,552.60
450 Supplies and Materials.....		1,233.61
451 Postage, Tel., Exp., and Freight.....		26.70
452 Travel Expense.....		37.40
453 Motor Vehicle Operation.....		198.87
454 Repairs.....		88.87
455 Equipment.....		84.11
Frank Stedman Hatchery:		
456 Salaries and Wages.....		2,948.25
457 Supplies and Materials.....		612.09
458 Postage, Tel., Exp., and Freight.....		93.55
459 Travel Expense.....		144.62
460 Motor Vehicle Operation.....		262.29
461 Repairs.....		214.68
462 Equipment.....		202.00
Roaring Gap Hatchery:		
463 Salaries and Wages.....		2,647.45
464 Supplies and Materials.....		1,594.43
465 Postage, Tel., Exp., and Freight.....		84.21
466 Travel Expense.....		126.64
467 Motor Vehicle Operation.....		337.28
468 Repairs.....		51.85



## STATEMENT OF RECEIPTS AND DISBURSEMENTS—Continued

	1928-29	1929-30
Boone Hatchery:		
470 Salaries and Wages.....		\$ 2,040.00
471 Supplies and Materials.....		1,351.34
472 Postage, Tel., Exp., and Freight.....		22.80
473 Travel Expense.....		9.90
474 Motor Vehicle Operation.....		162.19
475 Repairs.....		9.49
476 Equipment.....		15.00
Lake James Hatchery:		
477 Salaries and Wages.....		210.00
478 Supplies and Materials.....		30.49
479 Repairs.....		185.00
480 Coöperation with U. S. Bureau of Fisheries in operation of hatchery at Weldon.....	\$ 1,000.00	52.03
Total Expenditures.....	\$ 49,710.58	\$ 51,470.22
Less Receipts.....	28,280.07	52,596.35
Appropriation.....	\$ 21,430.51	\$ 1,126.13
Balance carried forward 1930-31.....		1,126.13
Game:		
481 Administrative Salaries.....		\$ 18,645.81
481-1 Salaries and Expenses, Warden.....		75,728.95
482 Supplies and Materials.....	7,051.45	689.27
483 License Buttons.....		6,485.30
484 Postage, Tel., Exp., and Freight.....	2,877.09	1,883.79
485 Administrative Travel Expense.....		6,331.61
486 Printing and Binding.....	8,614.10	3,909.42
487 Motor Vehicle Operation.....	121.27	553.44
488 Repairs.....	35.05	10.75
489 General Expense.....	424.73	1,607.94
490 Equipment.....	4,211.37	435.53
491 Farms and Refuges.....		51,868.97
Personal Services.....	115,345.22	
Travel Expense.....	23,146.35	
Refuges.....	23,760.39	
Fairs.....	705.00	
Bounties.....	2,077.25	
Motion Picture.....	3,015.94	
Stock.....	13,146.81	
Bonding.....	1,227.38	
Land.....	15,552.85	
Total Expenditures.....	\$221,312.25	\$168,150.78
Less Receipts.....	281,479.36	266,145.90
Appropriation.....	\$ 60,167.11	\$ 97,995.12
Deduct Forestry Advance.....		42,000.00
Balance carried forward 1930-31.....		\$ 55,995.12
IV. FORESTRY, FISHERIES AND GAME:		
Total Expenditures.....	\$393,666.75	\$355,168.69
Less Receipts.....	387,871.31	390,787.34
Appropriation.....	\$ 5,795.44	\$ 35,618.65

## STATEMENT OF RECEIPTS AND DISBURSEMENTS—Continued

	1928-29	1929-30
V. HOMECOMING WEEK:		
501 Invitations.....		\$ 1,548.58
502 Postage.....		556.03
503 Stenographic Help.....		449.60
504 Table and Equipment.....		59.00
505 Stationery.....		337.24
507 Office Supplies.....		26.82
Appropriation (Contingency and Emergency).....		\$ 3,526.92
Total Expenditures for Department.....	\$471,597.40	\$423,539.16
Less Receipts.....	399,668.79	395,303.17
Appropriation.....	\$ 71,928.61	\$ 28,235.99
Deduct amount expended from Contingency and Emergency (Homecoming Week).....		3,526.92
	\$ 71,928.61	\$ 24,709.07
Add Balance Game and Fish Licenses carried forward to suc- ceeding year.....	61,294.00	\$ 57,121.25
Amount expended from Appropriation.....	\$133,222.61	\$ 81,830.32
Appropriation.....	\$133,900.00	\$101,005.00
Deduct expense.....	133,222.61	81,830.32
Saving from Appropriation.....	\$ 677.39	\$ 19,174.68

## DIVISION OF COMMERCIAL FISHERIES

CAPT. JOHN A. NELSON, *Commissioner*

N. R. WEBB, *Fiscal Clerk*

VIRGINIA BROWN, *Stenographer*

G. L. ARTHUR, JR., *Bacteriologist*

Assistant Commissioners:

J. H. STONE, *Wilmington*

E. O. SPENCER, *Swan Quarter*

L. A. QUIDLEY, *Manteo*

### *Introduction*

The conservation and development of the resources of the sea is of paramount importance when we consider the growing demand for seafoods by our ever increasing population, and the fact that so many areas formerly fishing territory or oyster grounds have become depleted, or, in the case of the oyster grounds in other states, condemned on account of pollution. There appears to be a more widespread appreciation of the enforcement of the fish conservation laws and more hearty coöperation from the fishermen than in former years, in spite of the fact that there is a vast territory to be patrolled and an increasing number of fishermen with whom to deal.

I am happy to report that there has been an increase in most of the different branches of the fishing industry, especially is this true of the food fish; likewise a marked increase in oyster production and a substantial increase in clams and shrimp over our last biennium. There has been a falling off of menhaden products due to unfavorable conditions.

### *Food Fish*

Food fishing is the most extensive branch of our industry as it covers all the coastal section of the State, and in some places is a year-round activity for the fishermen. This phase of our industry has shown a marked increase over the last biennium, having produced more fish than any previous period in the history of our Department. There has been an abundance of fish—often an oversupply—and with the poorest market I have ever known. It is assumed the general depressed financial condition of the country is responsible for the unfavorable prices of seafood. The demand for fish in the last year has been so small that many of our dealers have been compelled to close down their business during the summer. I understand that one dealer in Morehead City recently shipped 190,000 pounds of croakers in one week and lost several hundred dollars on this one shipment.

A comparison of our last two reports to the Board would naturally lead one to believe that many more fish were caught this biennium than during the previous one. To keep the reader from thinking the difference in output of fish was as large as indicated by our table of figures, it might be well to state that part of this difference is due to a change in our method of gathering statistics. This biennium there has been a closer coöperation between the Federal government and our Department, and too, our field force has given the fishermen and dealers more help in working up their figures and getting them into the office. For these reasons alone our figures ought to



reflect more accurately than heretofore the actual catch of fin fish reported. Another reason for this increase in the catch of fish has been due to the discovery of new territory that never had been fished before by the sink net fishermen. About one hundred and twenty-five boats operated last winter and it is estimated they caught about \$200,000 worth of excellent fish.

Exclusive of the menhaden there were 82,945,150 pounds of fin fish marketed during this period which brought \$6,607,424. These figures are found to be in line with those reported by the Federal Government. Obviously, our figures in the past have been entirely too conservative.

### *Shrimp*

Shrimping is a local activity and is confined to two of our counties—Brunswick and Carteret—the former county producing by far the greater portion. Great quantities of this seafood are canned at Southport in Brunswick County and shipped, sometimes in carload lots to northern markets. Large amounts are also shipped in ice out of the State from that point, as well as from Beaufort and Morehead City in Carteret County.

This is the first season that shrimp has been on our coast later than December, but the past season they were found in commercial quantities throughout the winter and spring. There was no closed season on this activity during the biennium.

Our last biennial report showed a production of 953,956 pounds of shrimp at a valuation of \$143,043, while this period we are reporting 1,207,108 pounds valued at \$181,066.20—or an increase of 253,152 pounds—making an increased revenue to our State of \$37,972.80.

### *Menhaden*

This is strictly not an activity of poor men, considered from the financial standpoint. A factory with its boats and other equipment costs many thousands of dollars, and there is no guarantee that any operator will make interest on his investment during any given year. This is one phase of fishing that is absolutely dependent upon the weather. An ordinary stiff breeze in the wrong direction will stop the activity as effectively as would the total destruction of the boats and seines, because no fishing can be done in the ocean (where most of it is done) under these conditions. The matter resolves itself into a question of staking big money against the elements. Taken over a period of years most of the breaks are in the operators' favor. If he finances his business carefully he will make money; it has at least proved so in the past, but he must have the reserve either of cash or credit necessary to tide him over a lean year if the breaks are against him.

There is always danger of losing a boat while it is on the fishing grounds or returning loaded to the factory. As a matter of fact, a menhaden boat was lost this past year on the Cape Lookout shoal with about 350,000 fish aboard. It so happened that none of the crew was lost. The misfortune that befell this boat, every captain and crew engaged in this business know might befall them on any trip. Besides this constant danger to their capital afloat, the operators always are aware that their plants are likely to catch

on fire any time there is much scrap in the storage rooms, because the scrap is extremely combustible. So considered from all angles, the menhaden industry is dangerous both to the operators and to the crew.

There is a difference of opinion as to whether the supply of menhaden is on a decline. Some of the operators are inclined to believe that there are not as many fish as formerly, whereas, nearly all fishermen claim that there is an abundance of fish, but that unfavorable weather during certain seasons prevent their being caught. It so happened that our catch of menhaden was less this last biennium than during the previous one. 271,500,000 were caught this period which sold locally for \$1,355,000. From this total catch 1,476,500 gallons of oil were manufactured valued at \$619,920, and scrap in the amount of 19,357 tons valued at \$967,850 were manufactured. The investment in this activity amounts to about \$700,000 in boats, \$70,000 in nets and equipment, and in addition to this \$1,200,000 in factories.

### *Oysters*

Oyster production for this period has shown a marked increase over the past biennium. This gain is due largely to the fact that the oysters caught were the result of shells planted by the State some years ago, and also to the coming of the northern market to our State on account of the depletion of oyster bottoms in Chesapeake Bay. In my opinion, there is a greater future for the development of the oyster business than for any other phase of the fishing industry.

We have about 1,200,000 acres of oyster bottom and only about 12,000 acres producing oysters in commercial quantities. The oyster resources of the State have never been developed, and oyster culture is carried out on a very small scale. Our recent increase in the number of leases of oyster bottom for private cultivation shows that the interest of the people of North Carolina has been awakened to the development of this important resource.

In October, 1929, Mr. W. H. Raye, President of the General Seafoods Corporation of Boston, Mass., invited Mr. Lewis Radcliffe, U. S. Deputy Fisheries Commissioner, and me to go to Long Island Sound to see his company's plant there, in order to get first hand information along the line of oyster development. We accepted the invitation because it would afford us an opportunity to study the methods employed in conducting the largest oyster enterprise in the world. This company has about 36,000 acres of oyster ground under cultivation and its inventory in the oyster business amounts to \$4,500,000. At the time of my visit the oysters from these grounds were bringing \$10.00 per barrel, which means that the product was first class stock.

I invited Mr. Raye and Mr. Radcliffe to visit our State to what the possibilities are for the development of our industry here. I took Mr. Raye, Mr. Radcliffe, Col. Harrelson and Mr. Kelly on our boat for a trip over our oyster ground. Both Mr. Raye and Mr. Radcliffe expressed their belief that there are greater possibilities for the development of the oyster industry in North Carolina than in any other State. This visit stimulated interest in the planting of private oyster grounds to the extent that since December, 1929, we have issued about forty new leases and are having more



inquiries and applications at this time. The Board demonstrated its interest in private oyster culture in a practical way at its meeting in January, 1930, when, by resolution it relieved the new lessees of annual rent on oyster bottom for two years—from April 1, 1930, to April 1, 1932.

I think there is more money to be made from private cultivation of oysters than can be made from any other activity of the fishing industry. I hope that many others will be of this same opinion and engage in this work, as it is very evident this is the only solution of the problem now facing this important enterprise. In addition to this effort of private citizens, I would suggest that the State plant from 200,000 to 300,00 bushels of shells annually on our public oyster grounds. These oyster rocks are fast becoming depleted on account of the work done on them continuously and because nothing is put back to replace the oysters taken away.

During this period the yield of oysters from the public grounds of North Carolina was 792,704 bushels at an average price of sixty cents per bushel, or an increase to the people engaged in this industry of \$114,502 for the past two years.

### *Clams*

The clam is growing in importance as one of the fishery products of the State. It has enjoyed a gradual gain in production for the last several years. These shellfish are caught in Carteret and Brunswick Counties, although some are produced in Onslow and Pender and a few in Dare and Hyde Counties. There are two important facts about the clamming industry that have a general effect on this work. It is a year-round activity, although there is a closed season from May 1st to October 1st, in which clams cannot be shipped out of the State; and the equipment for taking clams costs very little, so that even women and children engage in catching them. During the summer months when the price of fish is low, or in the winter when the scallop yield is a failure, the smaller fishermen manage to pick up a living from this kind of work. The price of clams rarely falls below one dollar per bushel—even during the off season—which is the summer months, and ranges to as high as \$3.00 per bushel in winter.

There were 81,743 bushels of clams caught during this period at a value of \$143,050, an increase over the last report of 36,217 bushels and an increase in revenue to those engaged in this industry of \$51,800.

### *Escallops*

Escalloping is important to a smaller number of people than any other phase of the fishing industry. It is a local activity, as escallops are found in Carteret County only, and those chiefly in Bogue Sound. The output varies greatly from season to season on account of weather conditions. The first year of this biennium we produced 99,025 gallons of escallops, but the past season, that is from December 1, 1929, to May 1st, 1930, was almost a total failure. This was due to the heavy freshet that came in November and December, 1928, destroying the spat that would have produced the supply of escallops the following season. This shortage of escallops



brought on great hardships to the fishermen. However, I am glad to state that the present outlook for the coming season is very encouraging. This too, in spite of the great shortage of adult escallops last year.

The production of escallops for this biennium was 108,591 gallons valued at \$217,182, while that of the period 1926 to 1928 was 165,000 gallons at a value of \$330,000—a decline in revenue from this source of \$112,818.

We maintain a sanitary engineer in this Department for a period of eight months each year covering the shellfish season. The principal duties of this engineer are to test oyster and clam bottoms, to inspect factories, shucking and shipping houses and to furnish certificates to the shippers of shellfish, in order that their shipments may be made to comply with the Federal and State health regulations. Escallops are tested in our laboratory to determine whether or not they have been soaked.

Appended hereto is a brief report of our Sanitary Engineer covering his work with this Department. Following is a report covering shellfish sanitation and escallop control work done in the Department during the past biennium:

“Shellfish sanitation has gradually improved during the last two years. Last season practically all shucking house operators that had not done so, reconstructed and refitted their hot and cold water systems, which would give much better results than formerly obtained.

“The shucking houses at Morehead City, which are operated wholly by negroes, met requirements of the U. S. Public Health Service and were put back on the Service list, for the first time since 1926. Prior to this last season these houses had operated on an intrastate certification. Our entire shucking population—of about five hundred—proved by medical examination to be in fine physical condition. Not more than six shuckers were turned down when examined at the beginning of the past season.

“Truck trade which has steadily increased since 1928, at first gave an impetus to illicit shucking and selling oysters. This however, has been gradually checked by rigid enforcement and by encouraging community shucking houses, two such houses having been put in operation the past season. Plans are being worked out for stopping entirely this small amount of bootleg business, and no doubt, another season’s work will see this accomplished.

“From time to time bacterial examinations of shucked stock have been made and in every instance such stock has been found singularly free from pollution. Examinations of shell stock—that is clams and oysters—from the beds have shown that our products in this line are highly sanitary. No doubt this is due to the efficient patrol maintained and to the fact that our restricted areas are extremely small in comparison with our large unpolluted producing grounds. Experience has shown that our sanitary problem is one of handling and personal hygiene.

“With fine coöperation from the city and county health departments at Wilmington, Wrightsville Sound was re-surveyed during the month of February, 1930, and was found to be free from pollution. It was decided, however, to restrict a small area at Wrightsville and to allow the rest of the Sound to be opened and closed according to existing dates fixed by the Conservation Board.

“The escallop season of 1928-29 was a large one and at its beginning required a sharp checkup to stop soaking activities, which threatened to be-

come extensive. Coöperation at this time by the U. S. Agricultural Department representatives helped greatly, and our Department was able to handle the situation during the rest of the season. The season of 1929-30 was very poor and offered no great amount of trouble. Just a few soaking activities arose which were stopped by investigations on the escallop producing grounds."

G. L. ARTHUR, JR.,  
*Assistant Sanitary Engineer.*

### *Crabs*

This branch of the industry means much to the people of Carteret County, as the catching of soft shell crabs in North Carolina commercially is confined to this county. This activity is of considerable importance to the fishermen of Marshallberg, Harkers Island, Stacy, Williston, Smyrna and Davis, as well as to the shippers at Morehead City and Beaufort, from which points they are marketed.

The season in North Carolina opens six weeks before it does in Maryland and Virginia, and for this period we have a monopoly on the northern markets. No other similar marine industry in Carteret County employs as many people and is as profitable in so short a time as the catching and shipping of these soft shell crabs. The number of crabs caught varies from season to season as does the price. At the beginning of the season they are sold chiefly on the northern markets by Maryland dealers who establish headquarters here and work until the season opens in their own State, which is May 1st.

The production of soft shell crabs during the first half of our biennium was above the average, while the production of the season 1930 fell off about one-half. During the year 1929, 81,204 dozens of soft shell crabs were shipped out, at an average price of \$1.25 a dozen. The last year of the biennium there were only 41,058 dozens.

In addition to the soft shell crabs shipped from Carteret County there was a large quantity of crab meat sold canned by the factory at Morehead City, Manteo and two factories at Belhaven. This part of the crabbing industry has been more active than ever before. During the past biennium there was shipped from North Carolina 159,620 pounds of crab meat at about \$1.00 per pound. It is well to state here that our Department received no revenue from the shipment of this crab meat last year, as the law requiring a tax of five cents per gallon on crab meat was repealed by an act of the 1929 Legislature.

### *Diamond-Back Terrapin*

The diamond-back terrapin is so highly esteemed by the epicurist and it is so persistently sought by the fishermen, because of the fancy price it commands, that this slow-growing animal certainly would be doomed to commercial extinction (as in fact it already has been in many sections along the Atlantic seaboard north of this State) without proper protection and without the aid of artificial culture. As a means of protection this Department prohibited catching and marketing this animal for a period



of five years. This closed season expired April 15, 1929. Since that time regulations have prohibited fishing for and marketing this animal during the laying season. The evidence is these protective measures have been very beneficial.

In 1924 the North Carolina Fisheries Commission Board entered into a coöperative arrangement with the United States Bureau of Fisheries Station at Beaufort with the view of greatly expanding the terrapin cultural work already developed in an experimental way at the Federal government station. The breeding pens at the station were greatly enlarged and the brood stock was more than doubled. Just as the expansion of the cultural work got well under way a most unfortunate incident occurred for on October 2, 1929, during the most severe storm that visited the coast of the State for many years the walls of two of the pens containing a large part of the brood stock gave way under the pressure of winds and tides and the terrapins contained therein escaped. However, a small portion of the animals were captured. Since the storm, the Federal Fisheries authorities have reconstructed one of the pens and the accumulation of a new lot of breeding terrapins is under way. Unfortunately, this Department has been unable to assist the Federal Bureau in placing this work back on a productive basis, because of the lack of funds. Furthermore, the Federal Bureau, too, was handicapped for funds and additional money is urgently needed to place this important piece of work on a larger productive basis.

A small number—ranging from a few hundreds to a couple of thousand—of terrapins, generally a year or so old have been liberated each year from the hatching pens of the fisheries station at Beaufort since 1914. The number available for liberation was increasing rapidly each year and would have continued in increase, except for the disaster mentioned above. In May, 1929, close to 6,000 young terrapins and like number in May, 1930, were turned over to this Department for distribution and liberation. All of these animals had been held in a hot house during the winter where they were fed regularly and, although only about eight months old, many of them had gained considerable growth so that the average size of these terrapins was greater than that of animals more than twice their age when allowed to hibernate during the winter as they do in nature.

The terrapins were all marked before they were liberated, and, therefore, if they again fall into the hands of terrapin culturists at the hatchery, their age and rate of growth can be checked. The comparatively large number of makes the results of the plantings look very encouraging. The large returns, no doubt, are due to the winter feeding when the animals pass the liberated animals which have been observed later as grown terrapins through the critical stage of life, which occurs at the time when the yolk from the egg—a large part of which is enclosed in the protective shell with the animal at hatching and from which it derives its nourishment for some time after hatching—is all used up and the animal must shift for itself and find its own food. When the animals are cared for in the brooder house, food is provided but even under these favorable conditions quite a few of the young fail to survive. However, it is logical to believe that the death rate is far lower in captivity when food and heat are supplied than it would be under the more rigorous conditions in nature. When the young finally are liberated the majority of them have gained considerable growth, as



already stated; they have acquired a firm hard shell, and certainly they are much better equipped to take care of themselves than they are when first hatched or after hibernating all winter as they do in nature. It is firmly believed that the terrapin fishery which otherwise would be doomed to an early exhaustion can only be maintained through the artificial culture of these animals, combined with the proper regulatory measures. In order to carry on this artificial culture it will be necessary to have additional funds for replenishing the stock. To this end our Department has been requested to contribute \$1,500. I would recommend and urge that we furnish the amount asked for, as this activity will mean more and more to our industry as the years pass.

We have no statistics on the number of terrapins caught during this biennium, as no tax is imposed on either the fishermen or the dealer engaged in this business; and as no one handling terrapins is required to report to this office the number of animals shipped during any given period.

### *Patrol Boats*

The territory our boats have to patrol is vast—much greater than the average person would think it is. To patrol these hundreds of miles of water we have five boats. The “Capt. John A. Nelson”, the largest of our fleet is stationed at Morehead City and is used by the Commissioner for general supervision work in the sounds. However, during the summer months when the other boats are laid off this boat has to do patrol work in addition to its other duties. The “Roanoke”, our speed boat, is also located at Morehead City and is used for inspection duty, enforcing the laws and collecting licenses. The “Pamlico” has its headquarters at Swan Quarter, and is used by our assistant commissioner at that place. This boat is about eighteen years old and on account of its age and size is no longer safe for the work required in Pamlico Sound, and should be replaced by a larger boat. The “Pamlico” could then be used as an inspector’s boat. We now have to rent one for that purpose. Our assistant commissioner has been greatly handicapped in his work on account of the size and condition of the “Pamlico”. A new boat could be purchased for approximately \$4,000. The “Albemarle” stationed at Manteo is used by another assistant commissioner, who is in charge of the staking off of all the fishing limits; enforcing the laws and collecting licenses in Croatan, Roanoke and a part of Pamlico Sound. The “Chowan” is stationed at Edenton and is used by one of our inspectors at that point. He patrols the waters of Albemarle Sound, the Roanoke, Chowan and Cashie Rivers, enforces the laws and collects licenses in that territory. The total outlay in these patrol boats is \$34,500.

KIND, QUANTITY AND VALUE OF FISH TAKEN IN WATERS OF NORTH CAROLINA  
For the Period July 1, 1928 to June 30, 1930

Kind of Fish	Number of Pounds	Value
Trout.....	10,754,465	\$1,075,446.50
Sea Mullet.....	2,032,610	105,820.04
Bluefish.....	1,532,164	167,688.04
Mullet.....	3,537,218	353,141.80
Croakers.....	22,628,779	907,753.16
Spots.....	4,102,085	260,733.10
Hogfish.....	498,549	29,762.94
Mackerel.....	592,855	103,553.90
Shad.....	4,530,980	1,525,083.00
Herring.....	23,785,445	1,145,862.26
Butters.....	1,573,944	125,815.52
Carp.....	1,102,073	66,124.30
Flounders.....	926,741	83,006.78
Rock.....	1,111,190	177,398.40
Drum.....	329,837	24,048.59
Perch.....	1,062,511	106,478.80
Assorted.....	1,498,776	74,928.80
Cats.....	676,223	77,822.30
Eels.....	99,965	6,997.45
Jack.....	484,348	38,747.84
Pike.....	41,741	4,174.10
Bass.....	192,137	42,470.14
Pompano.....	12,303	1,845.45
Sea Bass.....	816,200	97,944.00
Sturgeon.....	16,427	4,106.75
Sheephead.....	5,584	670.08
Total Food Fish.....	82,945,150	\$6,607,424.04
Shrimp.....	1,207,108	181,066.20
Menhaden—Number of fish.....	271,500,000	1,355,000.00
Total value fin fish.....		\$8,143,490.24

## SHELLFISH

Oysters—792,704 bu.....	\$ 475,622.00
Clams—81,743 bu.....	143,050.00
Escallops—108,591 gal.....	217,182.00
Soft-shell Crabs—81,204 doz.....	101,505.00
Crab Meat—159,620 lbs.....	159,620.00
Total value shell fish.....	\$1,096,979.00

## TOTALS

Value of fin fish.....	\$8,143,490.24
Value of shellfish.....	1,096,979.00
Total value water products.....	\$9,240,469.24

STATEMENT OF RECEIPTS AND DISBURSEMENTS OF THE DIVISION OF COMMERCIAL  
FISHERIES—DEPARTMENT OF CONSERVATION AND DEVELOPMENT  
For Biennium 1928-29—1929-30

	1928-29	1929-30
1 Salaries and Expenses, Commissioners.....	\$ 11,597.77	\$ 12,136.61
2 Inspectors Salaries.....	11,320.20	10,433.15
3 Inspectors Expenses.....	303.40	47.85
4 Office Expense, Including Rent.....	2,101.21	1,986.40
5 Clerical Help.....	3,900.00	3,900.00
6 Salaries and Wages, Raleigh Office.....	500.00	.....
7 Publicity, Raleigh Office.....	100.00	.....
8 Marking Fishing Limits.....	200.00	449.27
9 Printing and Binding.....	370.17	495.37
10 Attorney's Fees.....	510.00	350.00
11 Patrol Boats.....	16,872.79	13,940.64
12 Motor Vehicle Operation.....	4,921.39	2,794.61
13 Shell Fish Sanitation.....	1,527.82	1,104.62
14 Terrapin Hatchery.....	1,350.28	681.46
15 Other Expenses.....	2,622.80	1,013.45
Total Expenditures.....	\$ 58,197.83	\$ 49,333.43
Less Receipts.....	45,207.52	49,544.93
Appropriation.....	\$ 12,990.31	\$ +211.50
Balance Carried Forward 1930-31.....	.....	211.50
Receipts:		
Food Fish.....	\$ 7,119.39	\$ 13,057.53
Oyster.....	14,698.40	21,286.55
Escallop.....	6,130.26	841.30
Clam.....	3,203.11	3,804.86
Crab.....	2,550.97	1,199.47
Menhaden.....	8,973.25	6,784.25
Power Boat Licenses.....	787.00	663.00
Other Sources.....	1,745.14	1,907.97
Total Receipts.....	\$ 45,207.52	\$ 49,544.93





NCDPR – PARTF Section - 0069